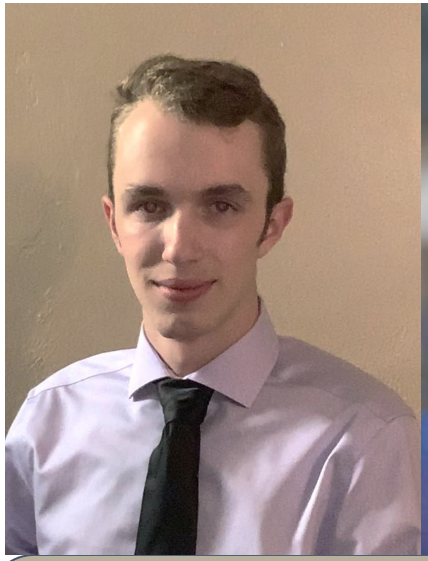
FPL Image Recognition for Pad Mounted Equipment

Team 304

FAMU-FSU Engineering

Team Introductions



Kent Logue

Mechanical Design Engineer

Jordan Wilkerson

Mechatronic Design Engineer

Sam Hammermaster

Software Integration Engineer

Erin Murphy

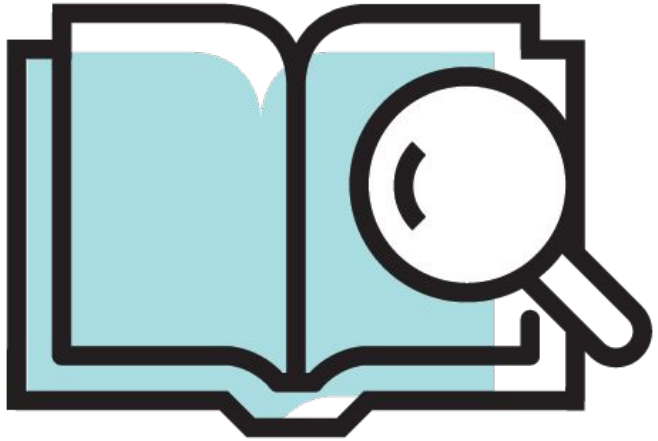
Project Manager

Gage Irwin

Computer Vision Engineer

Presentation Outline

- Sponsor introduction
- Project problem and background
- Project scope
- Goals, assumptions, and customer needs
- Functional decomposition
- Future work
- Summary



Sponsor and Advisor

Project Sponsor

Troy Lewis

Florida Power & Light

Project Advisor

Dr. Rodney Roberts

FAMU-FSU College of Engineering

The Problem

Background: FPLAir

- ➔ 10+ drone assessments per day
- ➔ Surveys thousands of miles of overhead equipment
- ➔ High-quality photos, videos, and infrared capabilities

Photo Credit: FPL Smart Technology
https://www.fpl.com/reliability/drones.html

Background: Current Infrastructure

Internal Fault Indicators

+

Successful Image Recognition

=

Using Computer Vision to Identify Fault

Project Scope

Objective

Assumptions

Key Goals

Markets

Objective

Develop a hardware beacon that indicates faulted FPL pad mounted equipment, and a method of identifying the beacon with machine vision.

Hardware Assumptions

Binary

Varying sizes

Obstructions

Software Assumptions

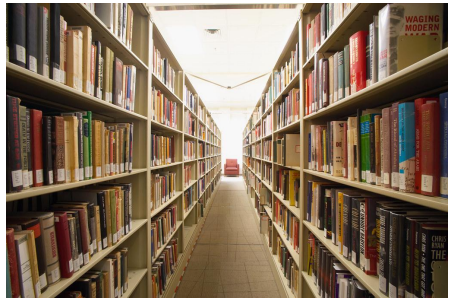
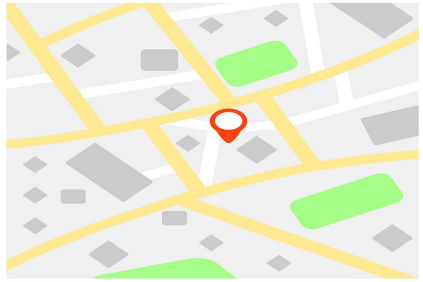
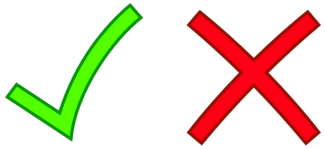


Photo Library

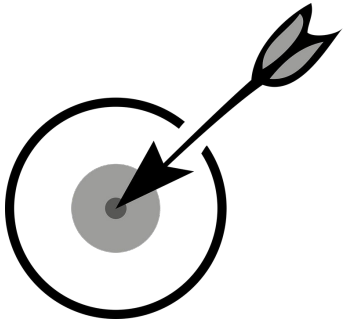


Given Location



Identification

Key Goals



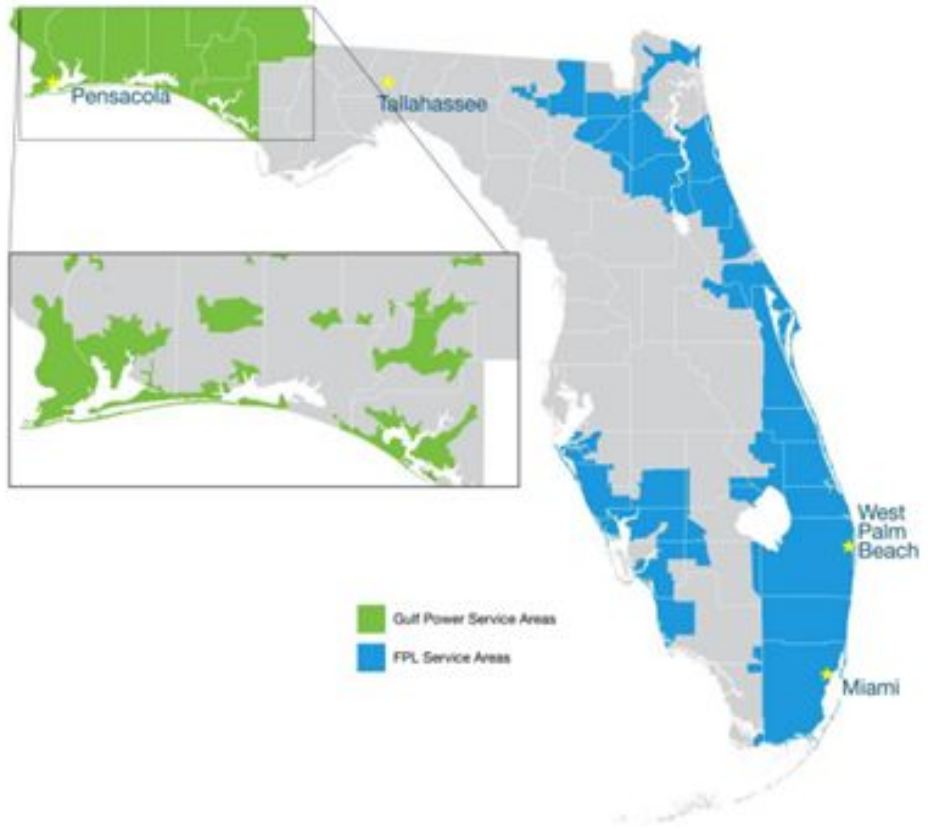
Accurate up to 50 feet

Securely Mount

Develop System to Identify

Markets

Florida Power & Light services approximately 5.6 million customers



Stakeholders

Florida Power & Light (FPL)

Smart Grid & Innovation

NextEra Energy

Stakeholders

Senior Design Coordinator

Dr. Oscar Chuy

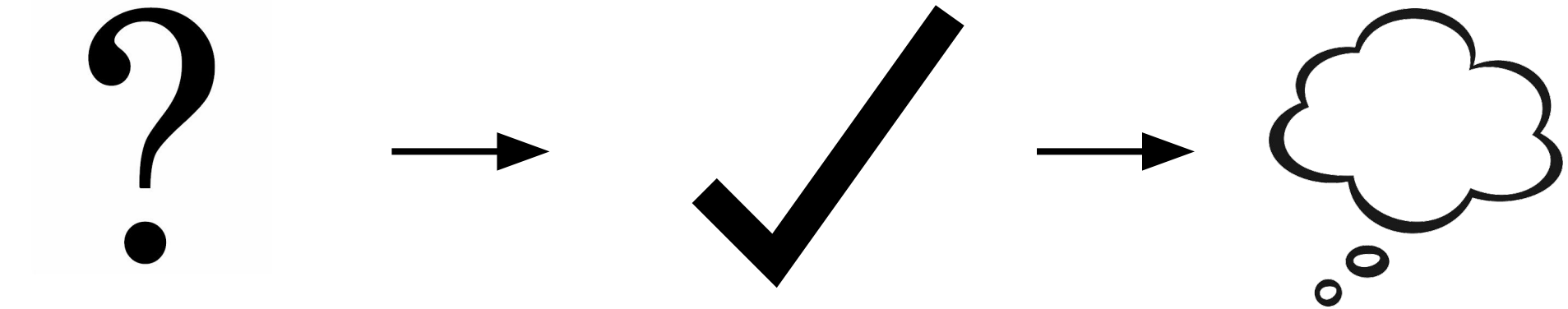
FAMU-FSU College of Engineering

Project Advisor

Dr. Rodney Roberts

FAMU-FSU College of Engineering

Customer Needs



Customer Needs: Hardware

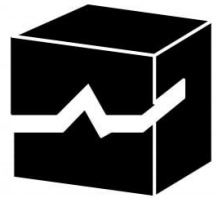
Inexpensive

Quick Instillation

Receives Power

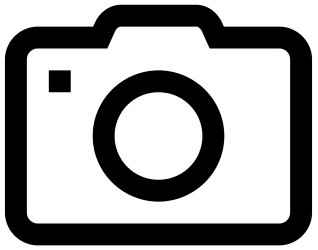
Weather Resistant

Water Tight

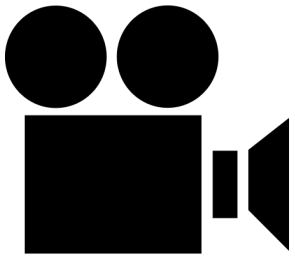


Cannot Interfere

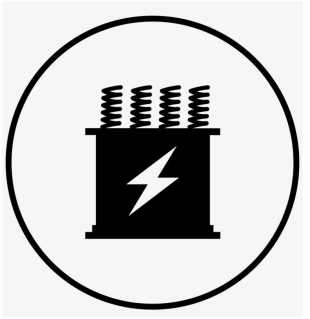
Customer Needs: Software



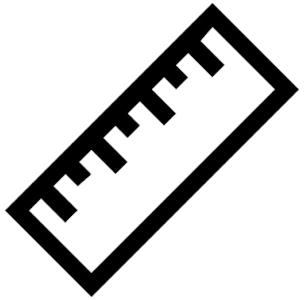
Works with pictures



Works with video



Recognizes transformer and beacon



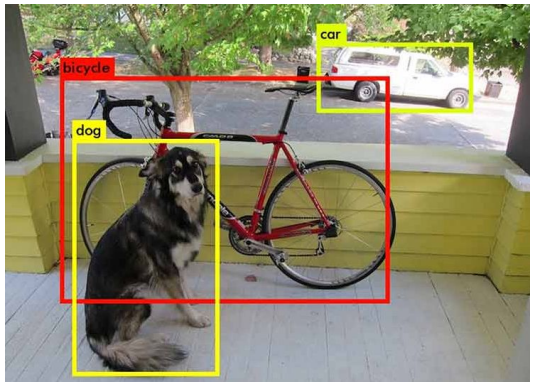
Can detect within 50 feet

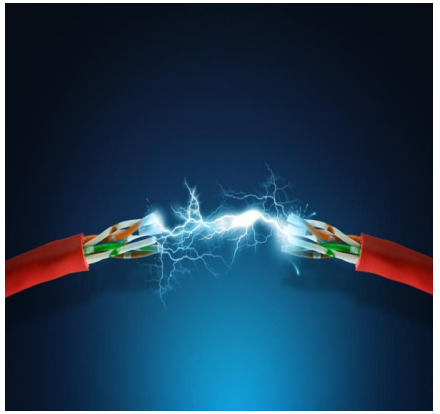
Can see through obstructions

aws

Compatible with AWS

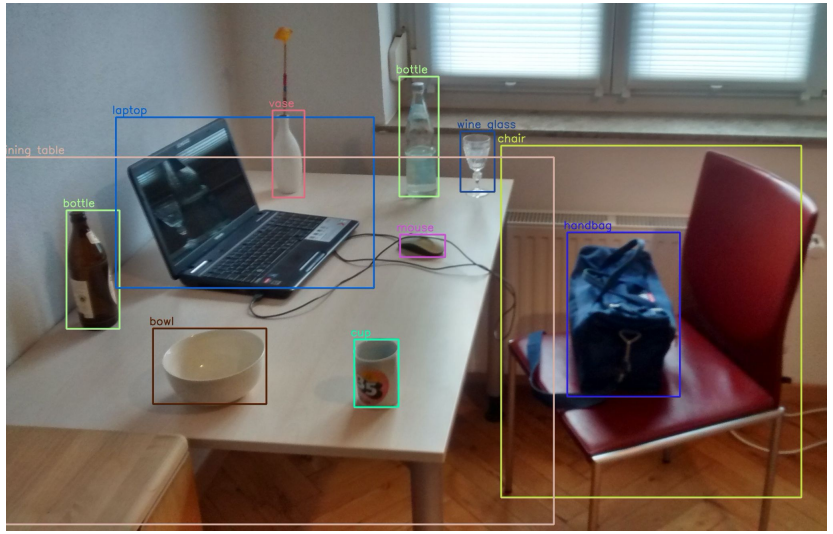
Functional Decomposition

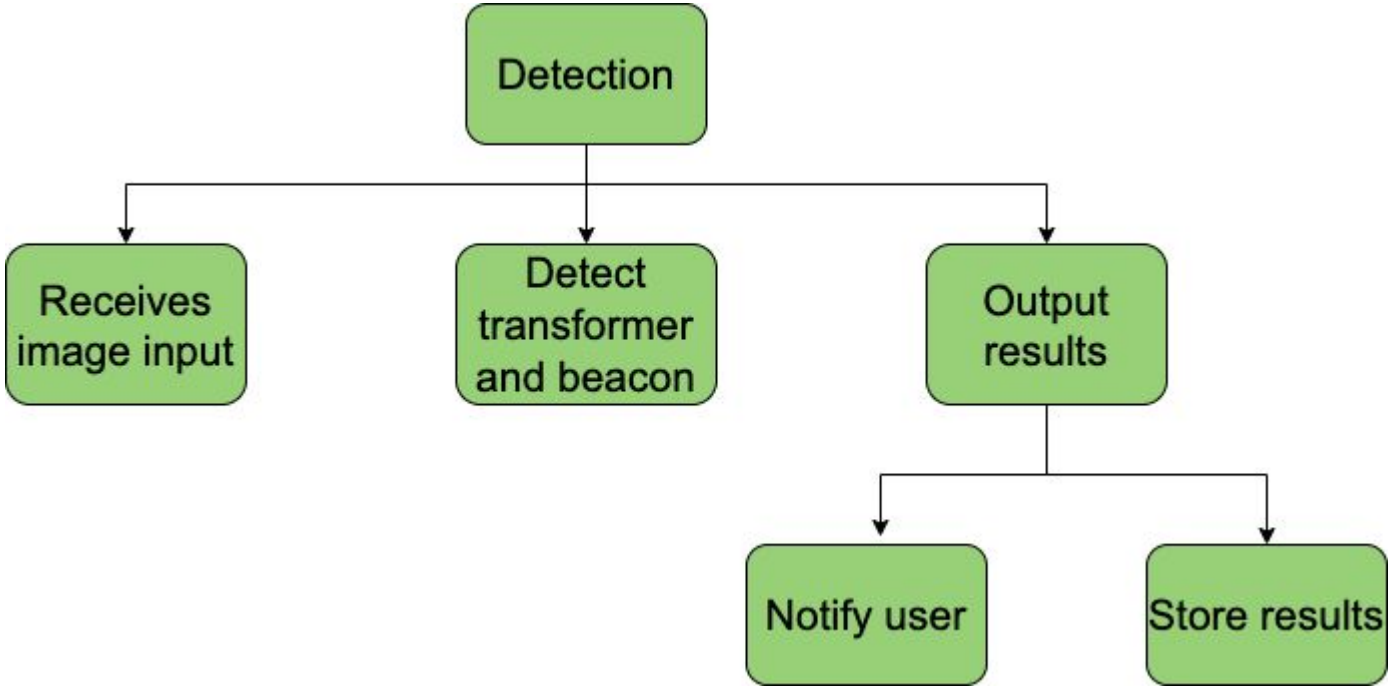




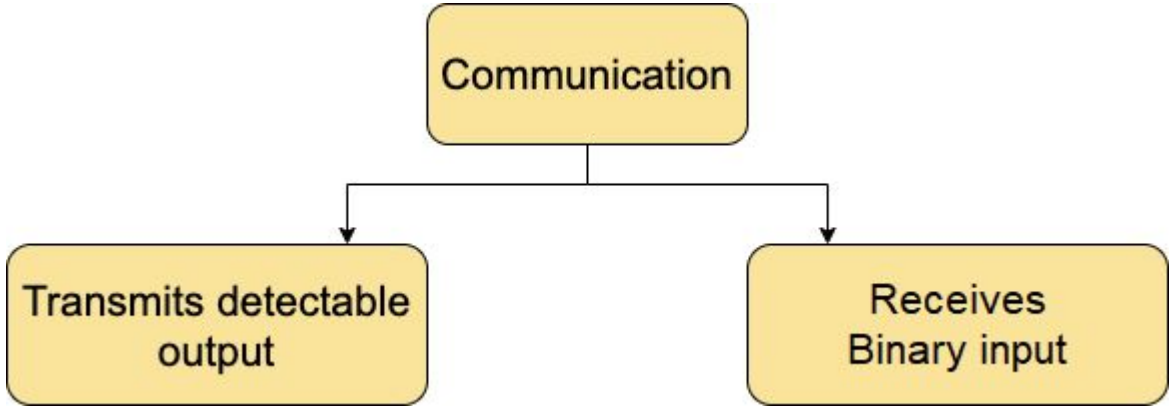
Detection | **Communication** | **Power** | **Attachment**

Detection

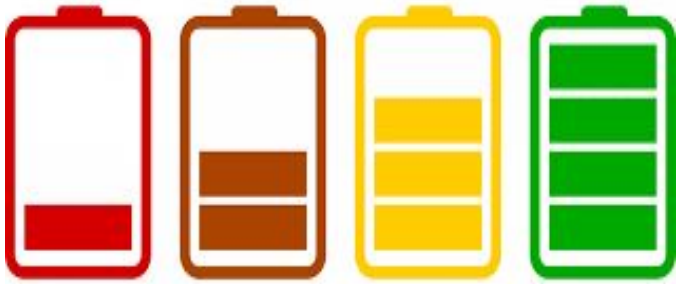

bottle
laptop
vase
wine glass
chair
bottle
mouse
handbag
bowl

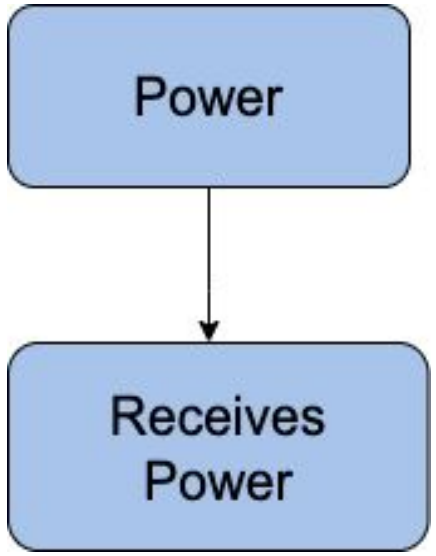

Detection
Receives image input
Detect transformer and beacon
Output results
Notify user
Store results

Communication



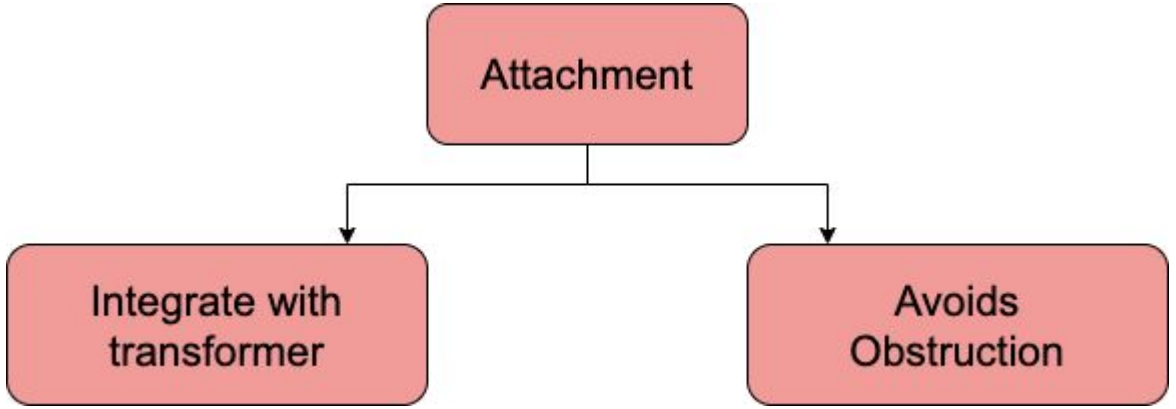
Power



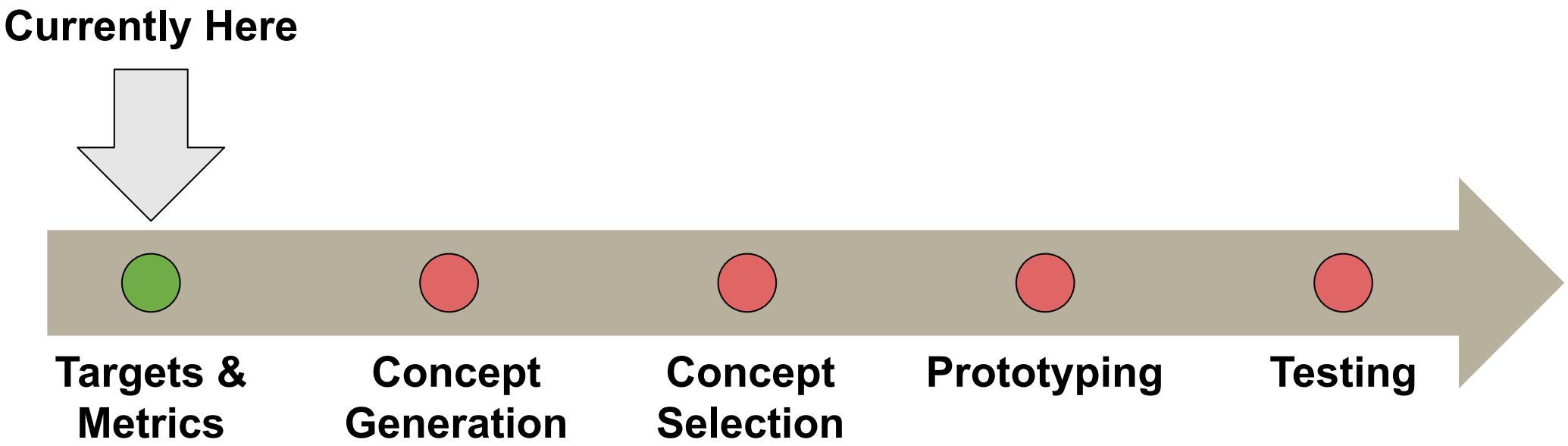


Attachment


23
21
4X4
AmeraTrail


Attachment
Integrate with transformer
Avoids Obstruction

Future Work


Currently Here
Targets & Metrics
Concept Generation
Concept Selection
Prototyping
Testing

Summary

- Thank you FPL and NextEra Energy
- Understanding our given challenge
- Incorporating existing solutions
- Analyzing key customer needs
- Defining our main functions
- Upcoming work

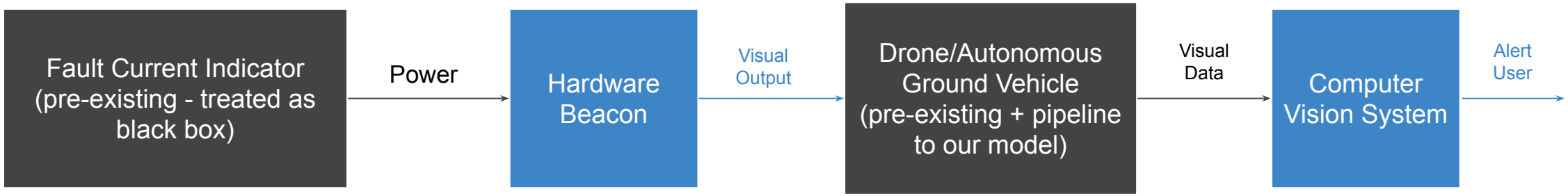
Questions?

Reference

Hurst, R. W. “Padmount Transformers Explained.” *The Electricity Forum*, Electricity Forum, https://www.electricityforum.com/td/utility-transformers/padmount-transformer.

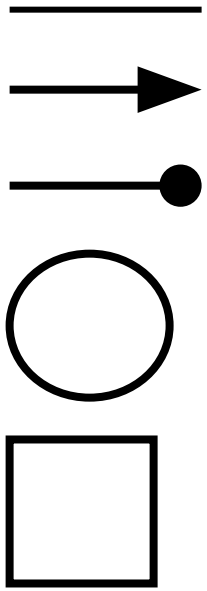
“FPL | Smart Technology | Drones.” FPL, *Florida Power & Light Company*, https://www.fpl.com/reliability/drones.html.

Design Pipeline (Potential Questions)

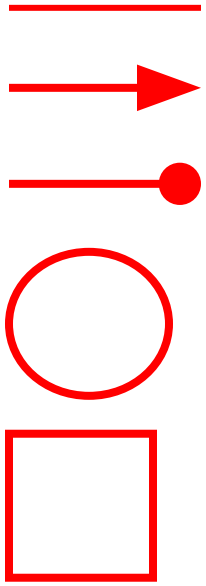


Standard Shapes

Summary Box



Text box 1



Outlined Text Box

Approved Logos

FAMU-FSU
College of
Engineering

FAMU-FSU
Engineering

FAMU-FSU
Engineering

FAMU-FSU
College of Engineering

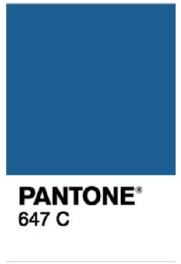
Color Palette

2299 C
Color values:
RGB 164 210 51
HEX/HTML #A4D233
CMYK 41 0 84 0

1788 C
Color values:
RGB 238 39 55
HEX/HTML #EE2737
CMYK 0 88 82 0

75% Black
Color values:
RGB 64 64 64
HEX/HTML
#404040
CYMK: 0 0 0 75

2239 C
Color values:
RGB 0 207 180
HEX/HTML #00CFB4
CMYK 59 0 39 0



647 C
Color values:
RGB 35 97 146
HEX/HTML #236192
CMYK 96 54 5 27

50% Black
Color values:
RGB 128 128 128
HEX/HTML
#808080
CYMK: 0 0 0 50

2199 C
Color values:
RGB 0 187 220
HEX/HTML #00BBDC
CMYK 77 0 16 0

7535 C
Color values:
RGB 183 176 156
HEX/HTML #B7B09C
CMYK 10 11 23 19

25% Black
Color values:
RGB 191 191 191
HEX/HTML #bfbfbf
CYMK: 0 0 0 25

APA Tables

Category 1	Category 2	Category 3	Category 4	Category 5
Item 1				
Item 2				
Item 3				
Item 4				

	Category 2			Category 3	
Category 1	subcategory 1	subcategory 2		subcategory 1	subcategory 2
Item 1					
Item 2					
Item 3					
Item 4					