Team 304: AR Training Application

Sponsored by Florida Power & Light

Alexis Cross, Christopher Sopeju, Kaitlyn Gurtner, Kevin Rodriguez & Max Urscheler

Team Introduction

Alexis Cross

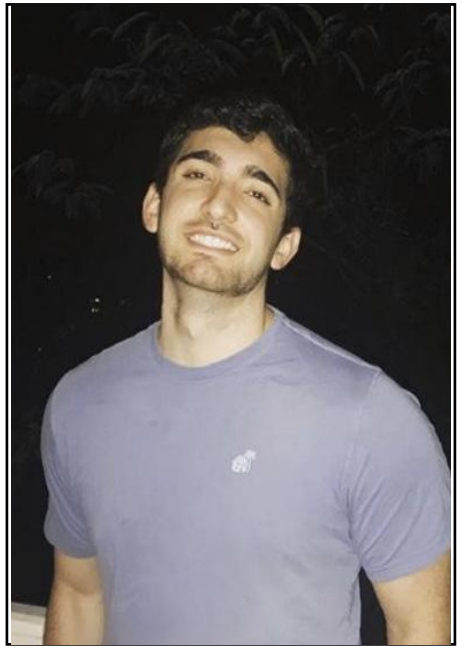
Technical Specialist

Christopher Sopeju

Lead Programmer

Kaitlyn Gurtner

Team Leader



Kevin Rodriguez

Lead Designer

Max Urscheler

Test Engineer

Presentation Outline

- Project Information
- Progress
  - Fall 2020 Recap
  - Spring 2021 Update
- Future Work

Project Information

Project Liaisons

Florida Power & Light

- Genese Augustin
  - Lead Project Manager
  - Smart Grid & Innovation
- Troy Lewis
  - Engineer II
  - Smart Grid & Innovation
- Kyle Bush
  - Project Manager

Faculty Advisor

- Reginald Perry, Ph.D.

Kevin Rodriguez

Objective & Motivation

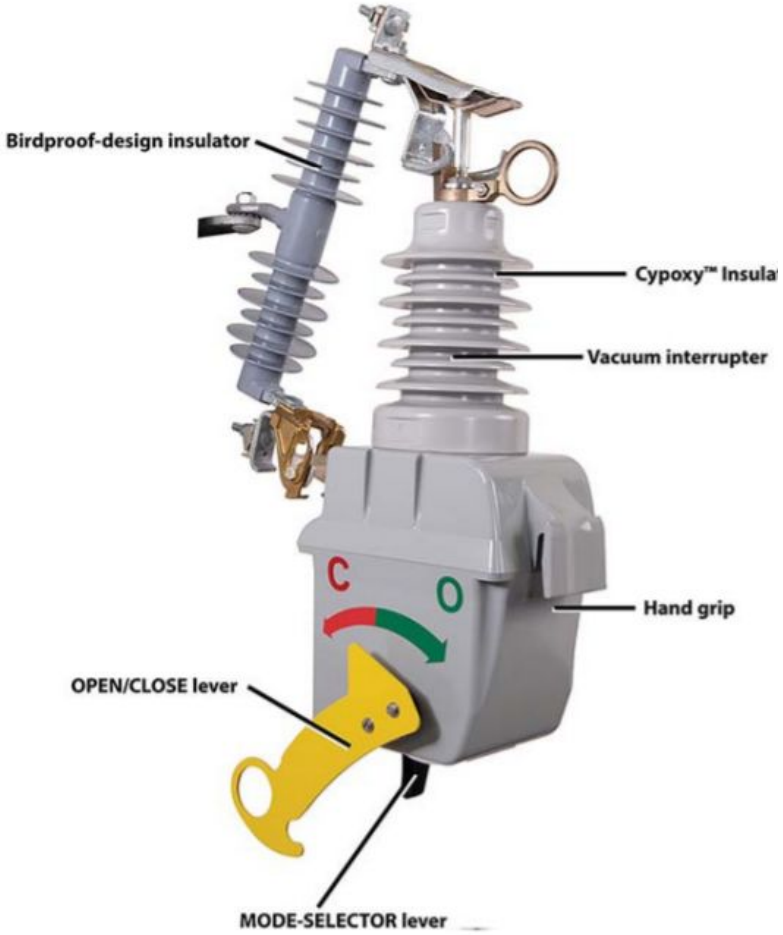
The objective of this project is to design an iPad application that will virtually train Florida Power & Light (FPL) employees on maintenance and troubleshooting procedures for the Automatic Transformer Switch (ATS).

The application will provide an in-depth look into the switch along with the various mechanisms that must be used during temporary and permanent faults. In addition to training, employees will be assessed on their knowledge of normal ATS operation, and maintenance and troubleshooting procedures. The design will be implemented via 3D modeling software so the employee may interact with the model and do so virtually.

Background Information -
Automatic Transformer Switch (ATS)

- Ensures the continuous delivery of electrical power

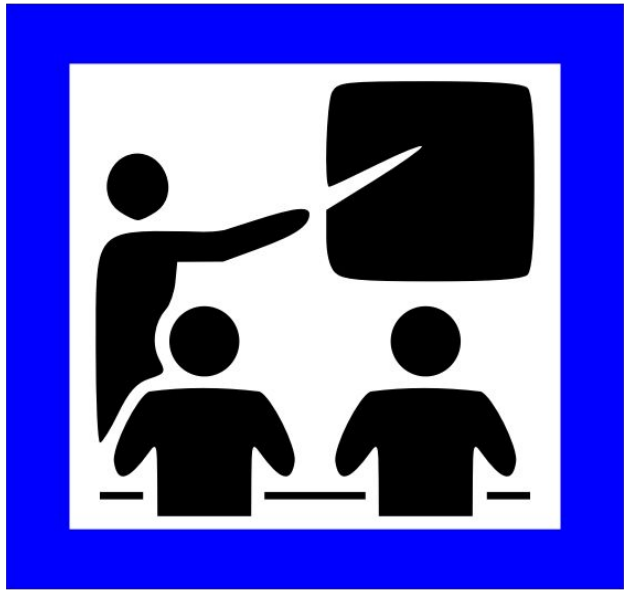
- Manual Operating Lever
- Non-Reclose Lever
- Position Indicator Semaphore
- System Health LED
- Non-Reclosing LED



Kevin Rodriguez

ATS Operation - Training Procedures

- Normal In-Service Operation
- Operation During Permanent Fault
- Operation During Temporary Fault
- Non-Reclose Lever Operation
- Manual Open Procedure
- Manual Close
- Troubleshooting



Kevin Rodriguez

Project Progress

Project Progress - Fall 2020

- Documentation & Project Planning
  - Needs, Requirements & Targets
  - Functional Decomposition
  - Concept Generation & Selection
  - Preliminary Design (Flowcharts)
- Familiarization of Tools & Software
  - Unity
  - C#

Customer Needs

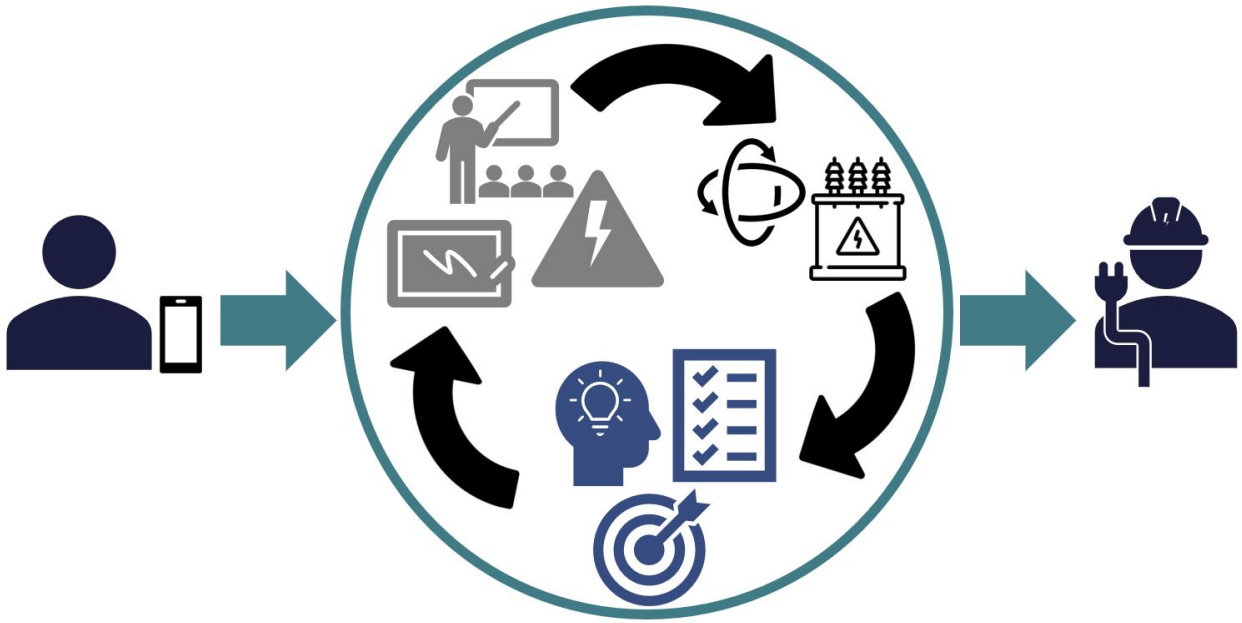
Identifier	Need	Source
N1	Train FPL employees on ATS maintenance procedures	Cust.
N2	Conduct training in a virtual manner	Cust.
N3	User-friendly/intuitive	Cust.
N4	Interactive experience	Cust.
N5	Easily distributed among FPL employees	Cust.

Customer Requirements

Identifier	Requirement	Need(s) Met
R1	Educate on ATS components and their functions	N1
R2	Educate on ATS maintenance & troubleshooting procedures	N1
R3	Final design is an iPad application	N2, N3, N5
R4	Simulate ATS maintenance & troubleshooting procedures	N1, N2, N3, N4
R5	Assess the user's knowledge & provide feedback	N1, N4
R6	Provide feedback during simulations and assessments	N1, N3, N4
R7	Simulation behaves and appears like real life experience	N1, N3, N4
R8	Allow user to freely interact with ATS	N1, N2, N3, N4
R9	Enable user to request information on ATS components	N1, N2, N3, N4
R10	Demonstrate opening and closing of switch procedures	N1, N2, N3, N4

Kevin Rodriguez

Design Approach



The application design will model an interactive training session and will consist of the following:

- Informative Videos
- Demonstrations of ATS and Components
- Ability To Interact With And Request Information On ATS
- Assessments Of End User's Knowledge

Max Urscheler

Selected Concept

- Production Method: Unity
- IDE: JetBrains Rider
- 3D Modeling: Maya
- Delivery Method: iPad Application
- Screen Design: Home/Menu
- Assessments: Multiple Choice & Scenario Based

Max Urscheler

Project Progress - Spring 2021

- Main Menu
- Assessment Module
  - Draft of Questions
  - Implementation
- Resource Gathering
- Animations (Alpha)
- Version Control & Documentation
- Website

Max Urscheler

Project Progress - Main Menu

Max Urscheler

Project Progress - Assessment

- Drafting of Questions
- Initial Unity Implementation
  - UI & C# Scripts
  - JSON: JavaScript Object Notation

Project Progress - Assessment


```
{
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      "timeLimitInSeconds": 20,
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        {
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              "answerText": "OPEN",
              "isCorrect": true
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            {
              "answerText": "CLOSE",
              "isCorrect": false
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          ]
        },
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          "questionText": "What is the purpose of the Yellow Manual Operating Lever?",
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            },
            {
              "answerText": "Manual OPEN/CLOSE",
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            },
            {
              "answerText": "Interrupter Position",
              "isCorrect": false
            },
            {
              "answerText": "Troubleshooting",
              "isCorrect": false
            }
          ]
        },
```

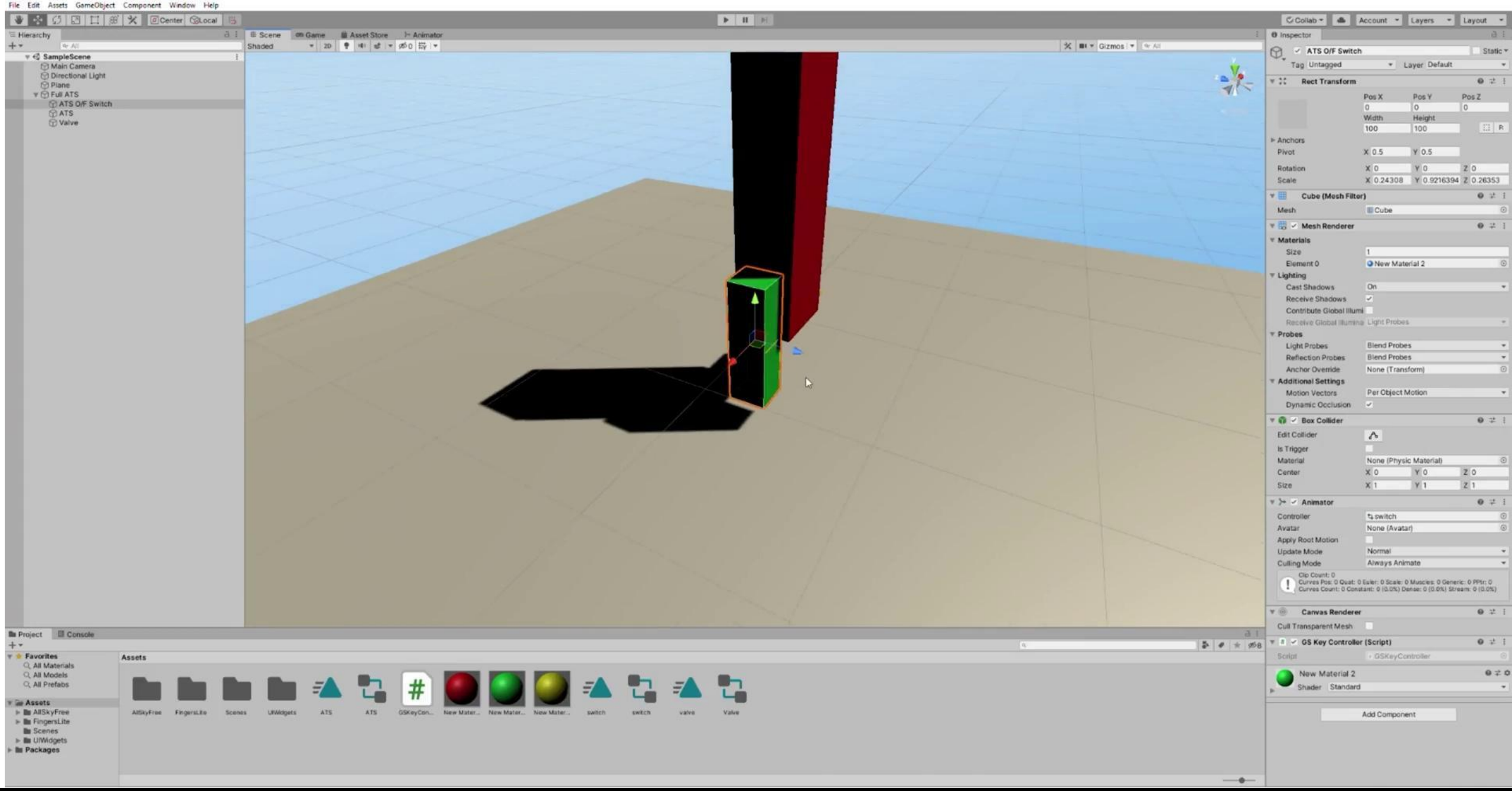

Max Urscheler

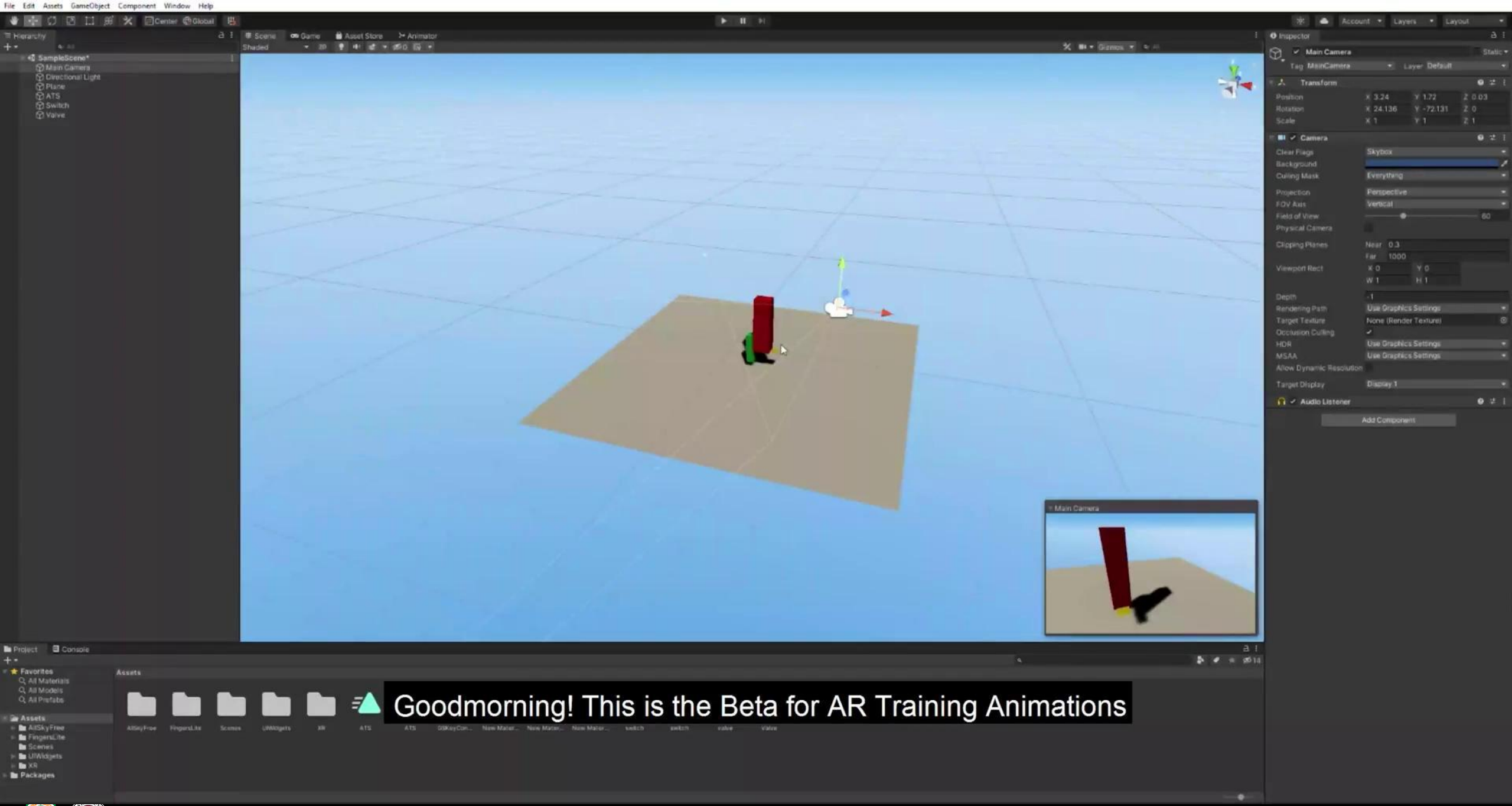
Project Progress - Assessment

Max Urscheler

Project Progress - Resources

- Successfully Contacted S&C About CAD Model
  - Currently Waiting on File Delivery
  - Contact: Jeremy Nelson
- ATS Information
  - Documents
  - Videos


File Edit Assets GameObject Component Window Help
Hierarchy
SampleScene
Main Camera
Directional Light
Plane
Full ATS
ATS O/F Switch
ATS
Valve
Scene
Game
Asset Store
Animator
Shaded
Gizmos
Inspector
ATS O/F Switch
Static
Tag Untagged
Layer Default
Rect Transform
Pos X
Pos Y
Pos Z
Width
Height
Anchors
Pivot
Rotation
Scale
Cube (Mesh Filter)
Mesh
Cube
Mesh Renderer
Materials
Size
Element 0
New Material 2
Lighting
Cast Shadows
Receive Shadows
Probes
Light Probes
Reflection Probes
Anchor Override
Additional Settings
Motion Vectors
Dynamic Occlusion
Box Collider
Edit Collider
Is Trigger
Material
Center
Size
Animator
Controller
switch
Avatar
Apply Root Motion
Update Mode
Culling Mode
Canvas Renderer
Cull Transparent Mesh
GS Key Controller (Script)
New Material 2
Shader
Standard
Add Component
Project
Console
Favorites
All Materials
All Models
All Prefabs
Assets
AllSkyFree
FingersLite
Scenes
UIWidgets
Packages


Goodmorning! This is the Beta for AR Training Animations

Project Progress - Version Control

- GitHub Repository
- Contains:
  - Website Files
  - Application Files
  - Documentation Files

README.md

AR-Training-Application

FAMU-FSU College of Engineering Senior Design Team 304

Project Description

Create a user-friendly and intuitive virtual application that correctly trains and tests Florida Power & Light employees on how to perform maintenance on an ATS (Automated Transformer Switch).

Documentation

Further documentation for specific components in this repository.

- Unity Documentation
- Website Documentation

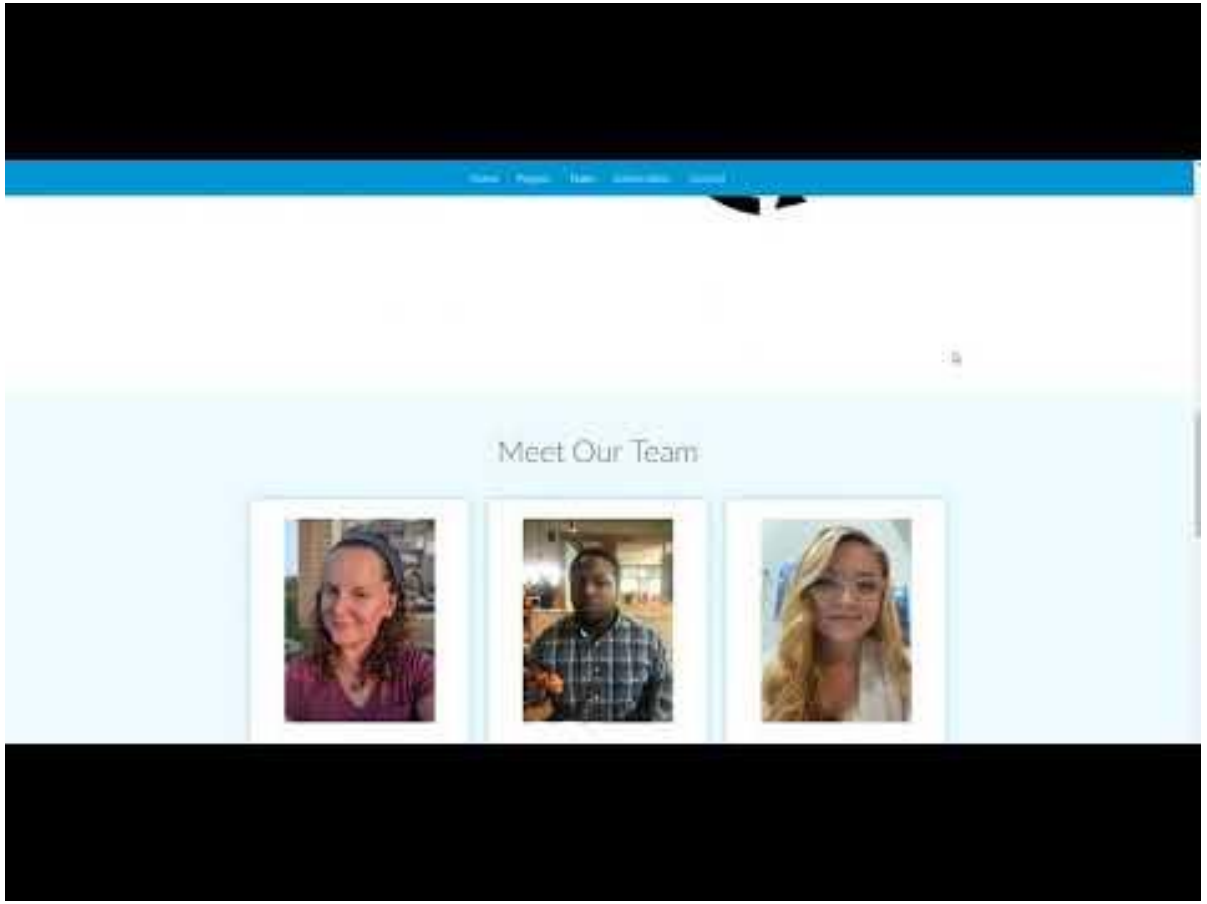
Color Scheme

Created using paletton based on main FPL color referenced as "Main Blue". Colors are given in the table below using their respective 6 digit hex values.

Color	Hex Value
Black	#000000
White	#FFFFFF
Gray	#696969
Main Blue	#0397D7
Light Blue	#0DA1E0
Dark Blue	#026A97

Christopher Sopeju

Project Progress - Website



Christopher Sopeju

Future Work

Future Work

- Obtain CAD Model
- Application Components
  - Video Player
  - Document Viewer
  - Continued Animation Development
  - Module Implementation
- Application Architecture
  - Observer Model
  - Database Implementation

Summary

- iPad Training Application
- Focus: ATS Maintenance
- Satisfy Customer Needs, Requirements & Targets
- Implement Derived Concept

Questions?