Synthetic Data Pipeline for Pose Estimation (Milestone 1)

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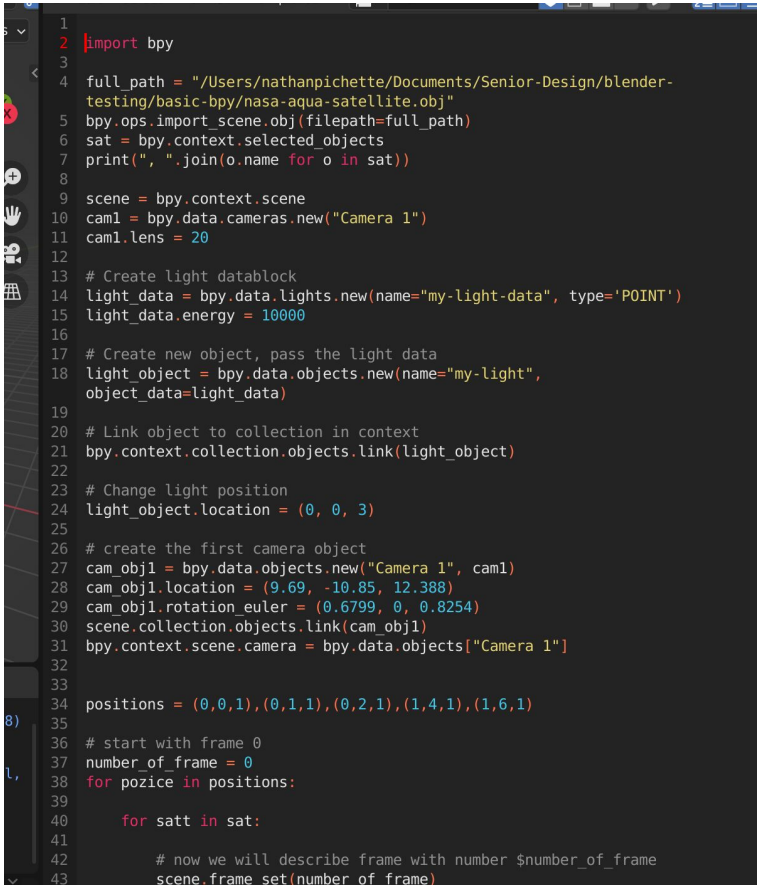
Overview of Milestone 1

- Testing blender functionality
- Sourcing and testing satellite models
- Creating basic python scripts for 3d rendering
- Write create requirement, testing, and design documents

Scripting with bpy

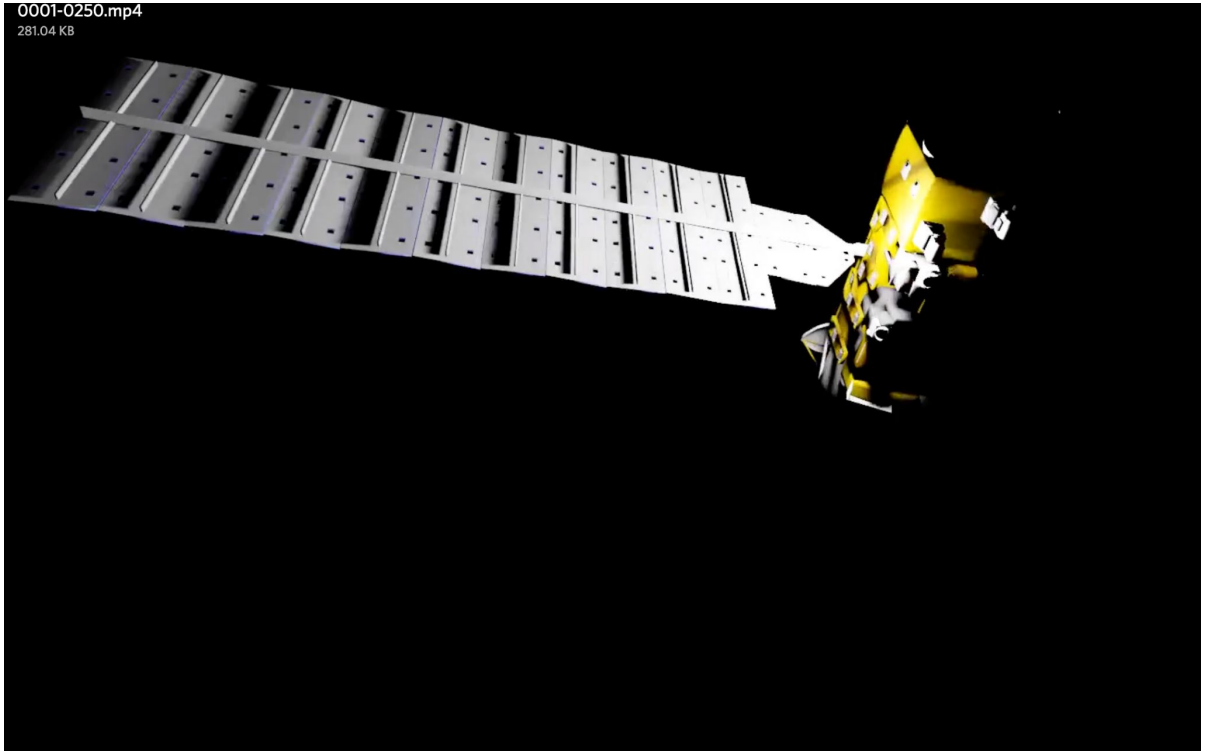
- bpy is a python package made for interfacing with blender
- Allows programming movement, lighting and object data
- Milestone 1 was focused on learning some of the basics of this library



```
import bpy

full_path = "/Users/nathanpichette/Documents/Senior-Design/blender-testing/basic-bpy/nasa-aqua-satellite.obj"
bpy.ops.import_scene.obj(filepath=full_path)
sat = bpy.context.selected_objects
print(", ".join(o.name for o in sat))

scene = bpy.context.scene
cam1 = bpy.data.cameras.new("Camera 1")
cam1.lens = 20

# Create light datablock
light_data = bpy.data.lights.new(name="my-light-data", type='POINT')
light_data.energy = 10000

# Create new object, pass the light data
light_object = bpy.data.objects.new(name="my-light", object_data=light_data)

# Link object to collection in context
bpy.context.collection.objects.link(light_object)

# Change light position
light_object.location = (0, 0, 3)

# create the first camera object
cam_obj1 = bpy.data.objects.new("Camera 1", cam1)
cam_obj1.location = (9.69, -10.85, 12.388)
cam_obj1.rotation_euler = (0.6799, 0, 0.8254)
scene.collection.objects.link(cam_obj1)
bpy.context.scene.camera = bpy.data.objects["Camera 1"]


positions = (0,0,1),(0,1,1),(0,2,1),(1,4,1),(1,6,1)

# start with frame 0
number_of_frame = 0
for pozice in positions:

    for satt in sat:

        # now we will describe frame with number $number_of_frame
        scene.frame_set(number_of_frame)
```

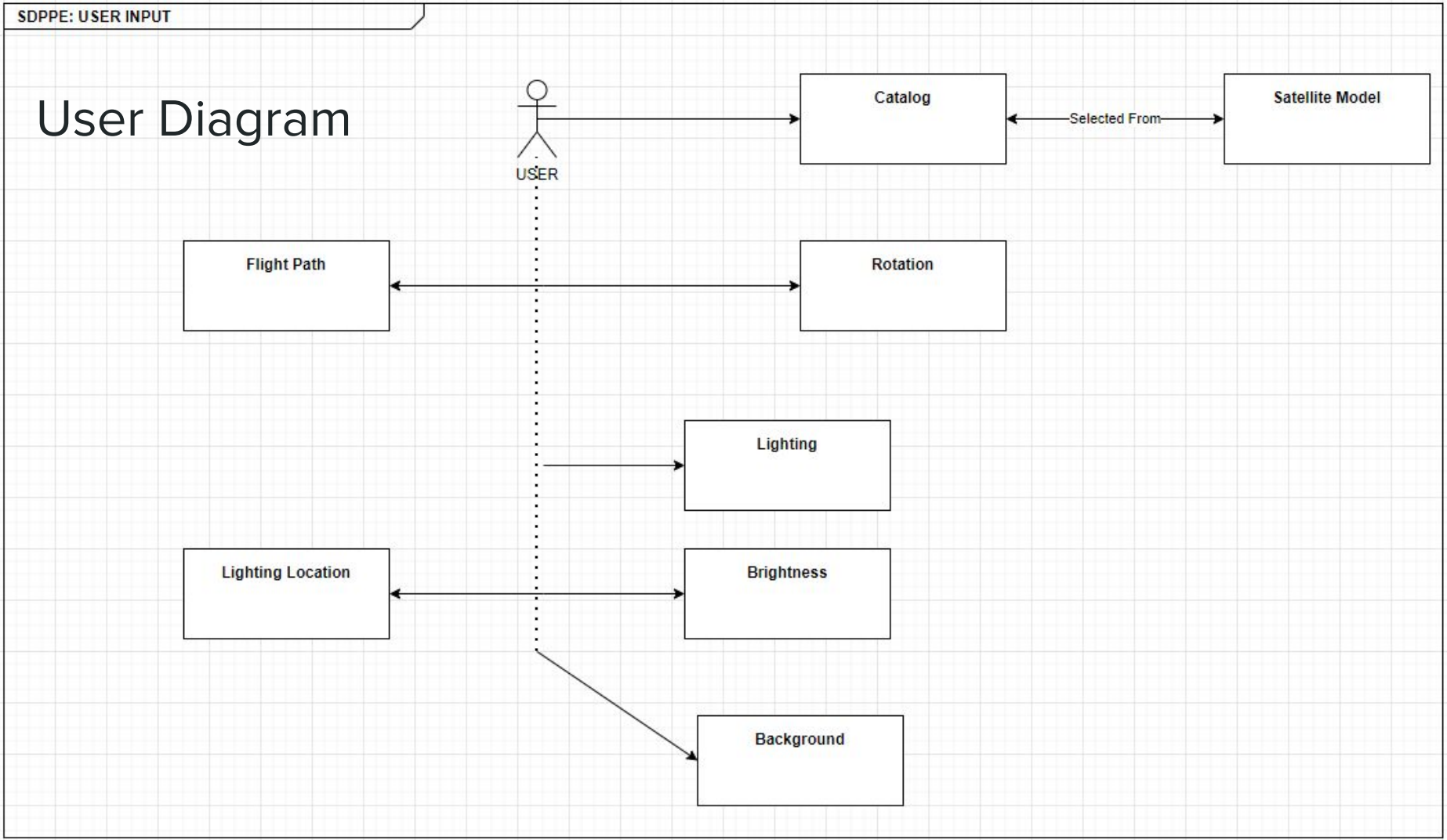
Demo

- Created a small clip
- Model loaded in blender
- Basic satellite texturing
- One light source
- Small rotation



Demo Video

User Diagram



Milestone 2 Goals

- Further understand motion to the 3D models given manually-created paths
- Simulate rotation and physics on the 3D models
- Implement lighting features to allow for adjusted brightness in different scenarios
- Test and create demos for each addition individually
- Extract pose information from each frame of animation

Questions