**Lightcurve-gen: Project Specification**

1. **Project Overview**

Purpose: To generate high-fidelity lightcurves using ray-tracing, CAD model of the Resident Space Object (RSO), and representative material properties.

Output: With an accurate lightcurve simulation tool, a lightcurve ‘fingerprint’ can be generated to match observed lightcurves to identify RSO characteristics such as attitude, operational state, and any external degradation.

1. **Input parameters**

**RSO CAD model**

The following object file types are compatible with blender: FBX, OBJ, STL, 3Ds, AutoCAD (DXF)

**Material Properties by Format:**

* **FBX & 3DS**: Include embedded material definitions
* **OBJ**: Geometry only, may include companion .MTL file with materials
* **STL & DXF**: Geometry only, no material data

When CAD models lack material properties, user will need to manually define materials in Blender.

1. **Output**

**Data output**:

* Intensity in W/m^2
* Optional: Rendered animation of the relative rotation of the illuminated spacecraft

**Plot output**:

* Matplotlib render of ‘fingerprint’

1. **What has been done:**
2. **To do (now):**

* **Write down the methodology, how does the ray-tracer work.**
* Decide whether monochromatic response is acceptable? (average over RGB channels? Just use one channel? Produce channel response to various materials… found that the received ‘intensity’ is nearly identical for RGB)

1. **To do (later):**

* Lunar light
* Earth Shine
* Simulate solar panel
* Produce several plots for how the define material affects the lightcurve