CUBE SATELLITE ENVIRONMENTAL SIMULATOR

DESIGN ALTERNATIVES PRESENTATION

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Mission Objective:

Our goal is to design and build a simulator that can reproduce the sun as a source of radiation, and rotate the cube satellite in order to determine the amount of power it receives from the solar cells with respect to its angle.
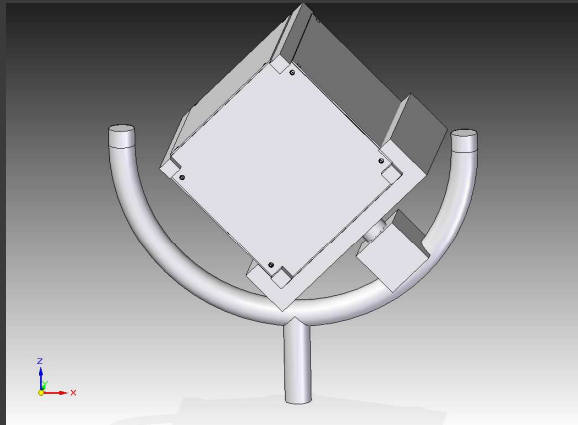
REQUIREMENTS

- Rotate satellite about multiple axes at a speed of 1-5 rpm
- Produce a light source with the same spectrum and intensity as the sun
- A reflective surface to represent the albedo of the earth (30%)
- No spurious light reflections
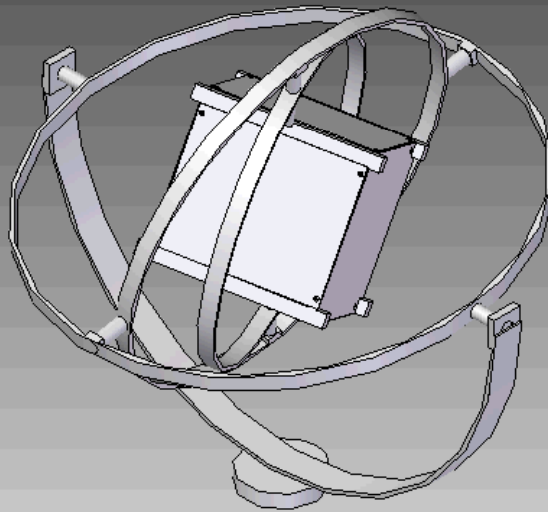- Ideally fit into an anechoic chamber

DESIGN CONCEPTS
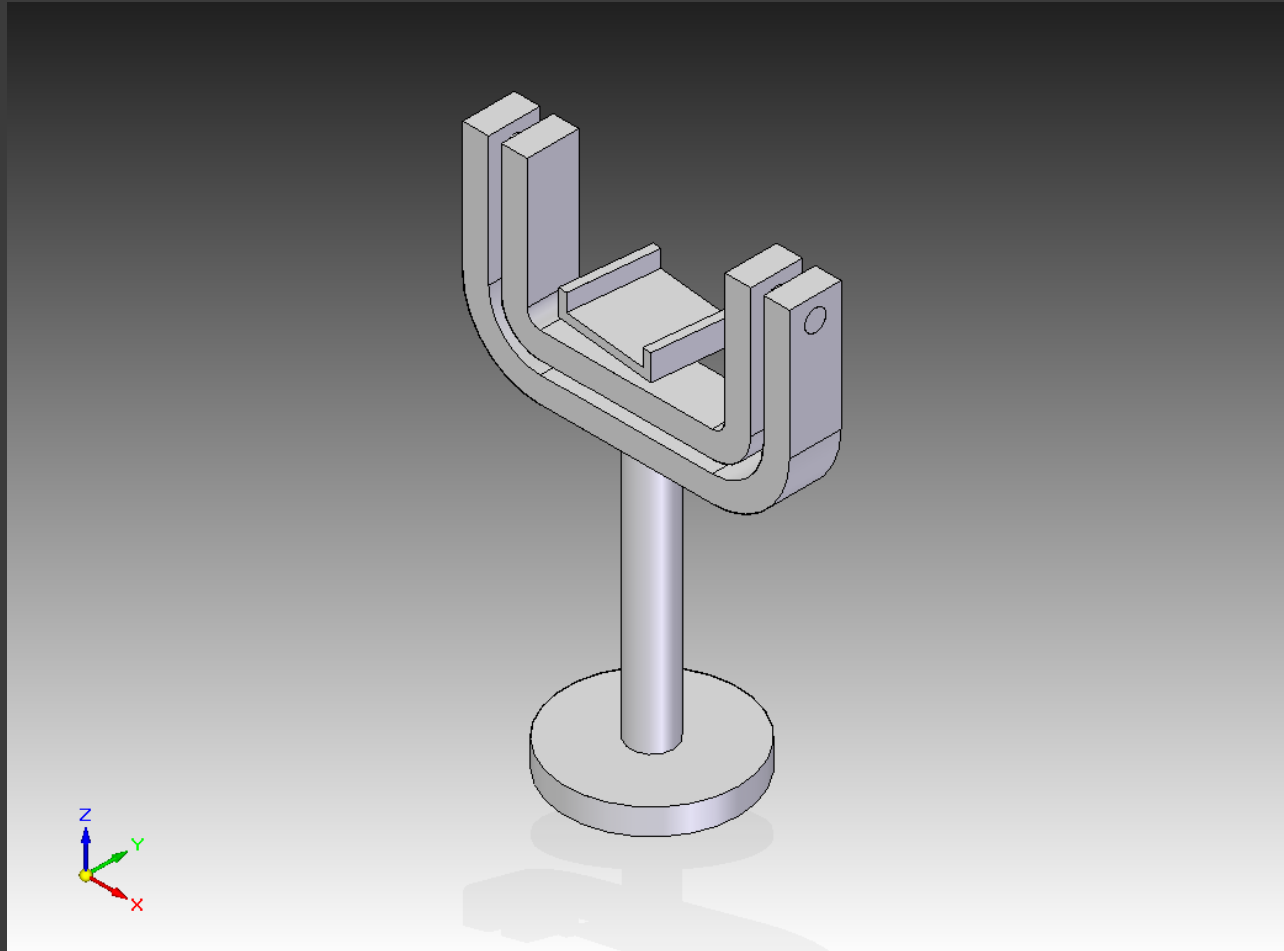
NEW IDEA FOR CLAMP

ALTERNATE CONCEPT: GYRO

MOTORS

- We'll be using a DC motor to power the rotation of the cube

IG32P 24VDC 008 RPM Gear Motor

Reduction Ratio	Rated Torque	Rated Speed	Rated Current	No Load Speed	No Load Current
	kgf-cm	rpm	mA	rpm	mA
1:721	12	8	<900mA	8	<450mA

STEPPER MOTOR:

➢**We will use stepper motors to control the angle
at which the swing rotates**

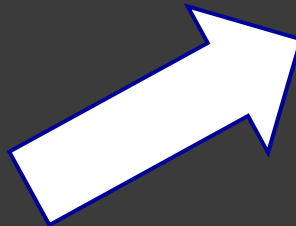**UCD1/7; UCD2/8**

Dimensions (mm): 28 x 24
Step angle (°): 7.5
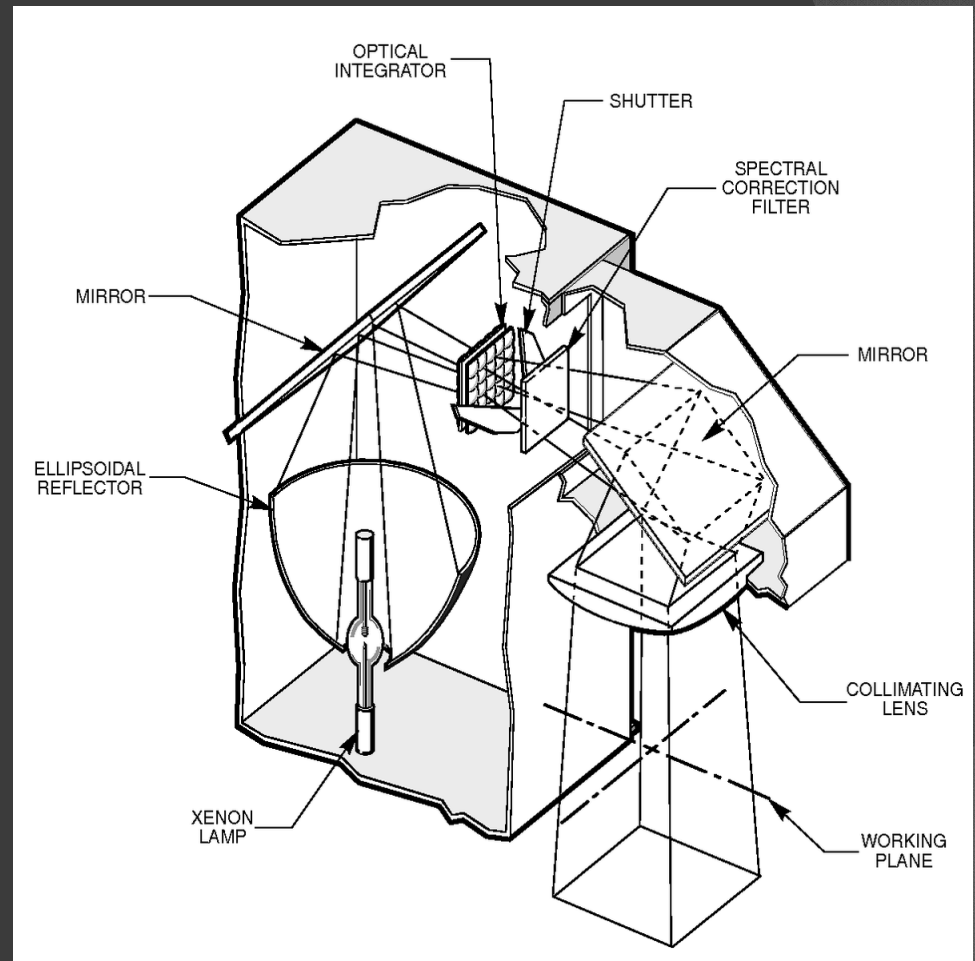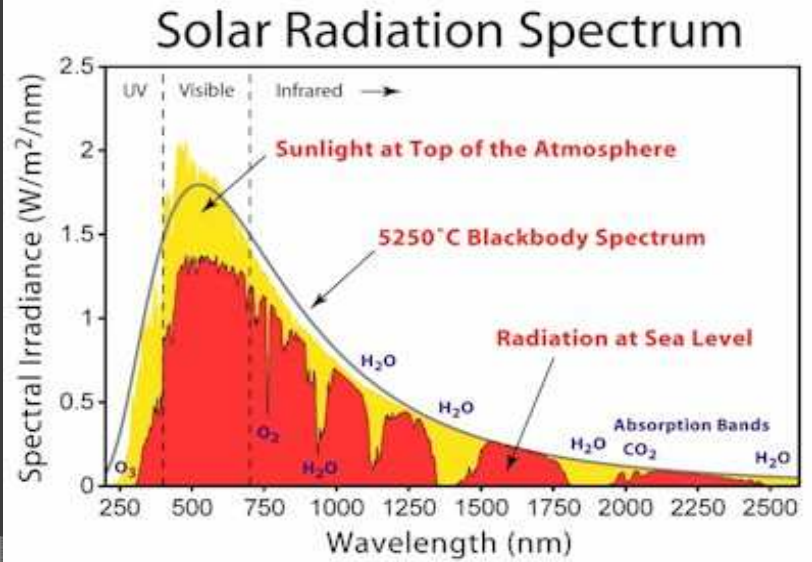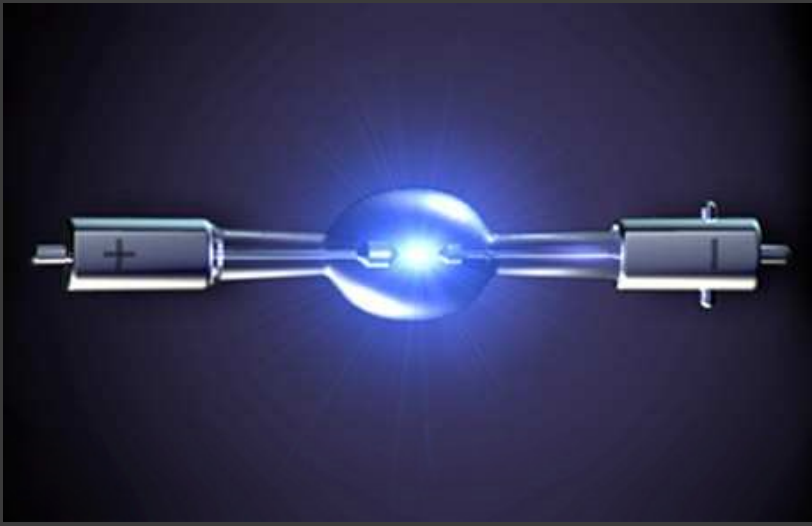Holding torque * (cNm): 1.6 – 2.7

COMPUTER INTERFACE

Controller

Visual Feedback

+

SOLAR SIMULATION
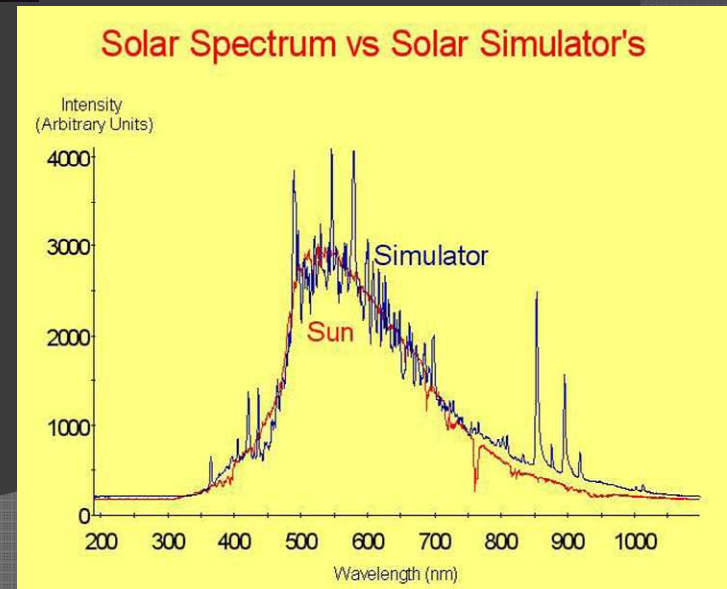

Solar Radiation Spectrum
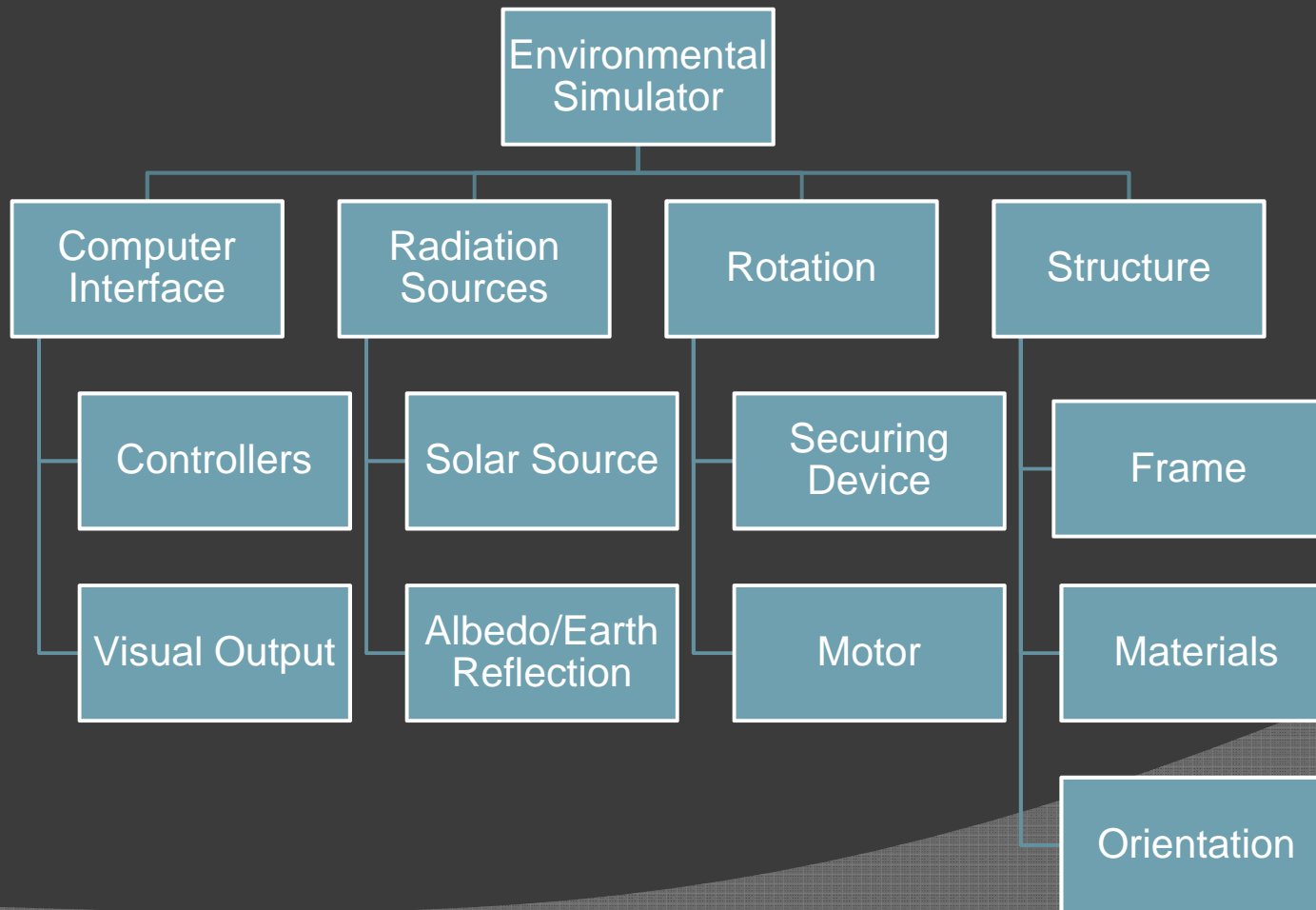
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Mercury Arc Bulb

Halogen Bulb

Halogen+metal halide

SYSTEM HIERARCHY

CONCEPT OF OPERATION

- Secure the Cubesat into clamp
- Orientate system to a certain degree
- Set DC motor to desired rpm
- Turn on light source
- Analyze results using computer interface