



Harvest the Sun

A Fresnel Thermolectric Power Generator System

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The goal of IRIS is to harness the thermal energy of the sun with the most efficiency possible. To achieve this, the unit will **actively follow** the location of the sun across the sky. To capture the energy of the Sun the unit uses a Fresnel lens to concentrate the rays of the sun onto an absorber attached to a Thermolectric Module (TEM); this heats one side of the device while the other side is kept at an ambient temperature through the use of a fan and heat-sink. The resulting temperature gradient causes heat flow across the Thermolectric Module that produces current. The current flow is stored in a battery. The battery power will be used to sustain unit operations.

To maximize the power output from the TEM module, the device needs to actively track and face the sun. To achieve this goal, the unit contains a variety of sensors, actuators, and a microcontroller unit. The sensors include: a quad silicon sensor used to ensure direct Fresnel lens position towards the sun, a silicon light sensor to determine daytime/nighttime, and micro-switches to sense position.

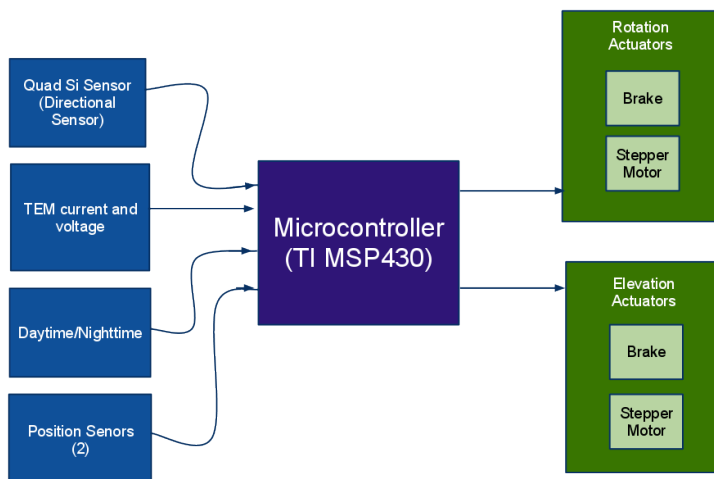


Figure 1: Internal system flow

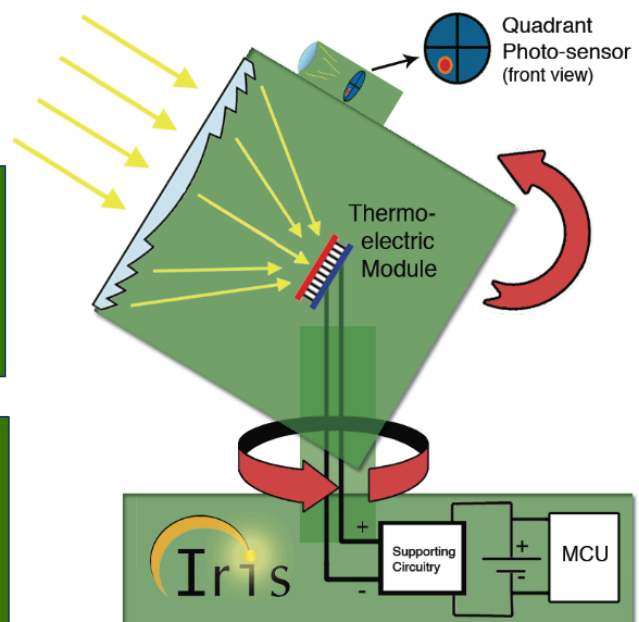


Figure 2: Simplified Unit Functionality