Sun Geometry Team - American-Made Solar Prize Round 3 - Technical Assistance Request

In order to validate the OptiFold technology, we've built a prototype solar battery charger (see adjacent image). We need assistance from the national labs and private sector in the following areas:

1) Development, in parallel, of the sensor as a standalone technology that can benefit other solar technologies.

The sensor is a simple product compared to the system, which spans mechanics and mechatronics.

The sensor can benefit different types of PV systems, particularly, single axis trackers and smart micogrids.

2) Assistance with coating:

a. Achieving long-term silver (Ag) mirror coating passivation for highest reflectivity. For example, a sandwich between nitrides of Nickel, Copper.

b. Selection of reflector materials and how to manufacture such materials domestically. For example, can we use injection-molded amorphous (Mg) alloys. Another example is the possible use of glass with textured parabola surface.

3) Assistance in the selection and testing of low cost, high reliability actuators. We seek ultra-reliable motion control with micro actuators. For example, the use of a piezo motor to eliminate the need for a supplementary transmission (i.e. gear train).

4) Assistance in the area of battery integration from an electrical design engineer including:

a. Integration of the four photovoltaic (PV) cells output to interface to actuators so the reflector aims at the sun (i.e. tracking), and ensures generated PV electricity flows to the battery for storage.

b. Support in implementing an optimized battery management system for our Alpha 4 watt, 12 volt product.

5) Assistance to achieve our long term goal of linking the electrical outputs of mechanically independent reflectors in a panelized array to elegantly combine the electrical output.