

PROJECT OBJECTIVES

Goal:

- (1) Develop a novel heliostat that will reach the SunShot collector cost target without sacrificing optical or structural performance
- (2) Wireless, locally-powered communication and control system that decreases these cost aspects by at least 20%
- (3) Autonomous optical calibration and tracking technique

Innovation:

- (1) Cable/rim drives to minimize motor torque and cost
- (2) Elimination or minimization of all field wiring and associated cost
- (3) Individual heliostat control costs reduced by central, image-based calibration and tracking

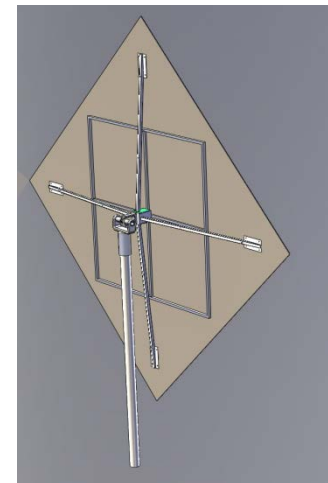
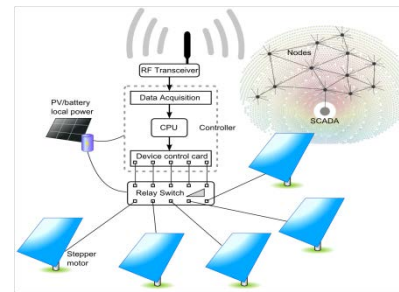
Milestones:

- (1) Optically characterize heliostat in 3 different static loading positions (Sept)
- (2) Go/no-go on whether wireless system can achieve 20% cost reduction (Sept)
- (3) Go/no-go regarding capability of tracking and calibration (Sept)

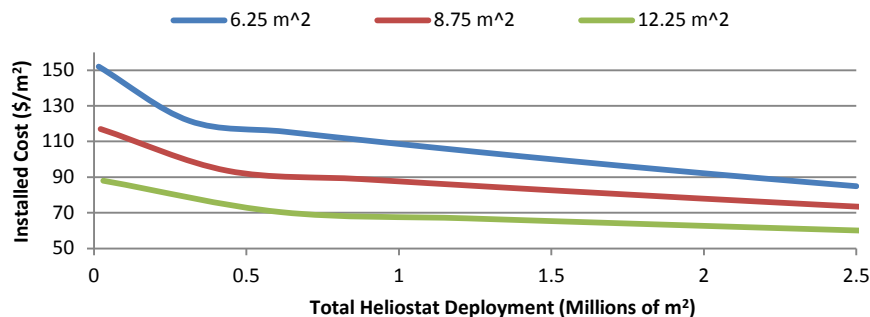
APPROACH

Considerations in approach:

- Material-efficient design
 - Optimized back structure
- Off-grid redundant, shared-node, mesh network communication system
- Imaged-based closed-loop control system



KEY RESULTS AND OUTCOMES



- Cost analysis is showing decrease in cost with just slightly larger mirror size.
- Increase in materials is taken into consideration in cost analysis.

NEXT MILESTONES

- Optically characterize heliostat in at least three different static loading positions. (9/30)
 - Challenging due to measurement difficulty. A combination of VSHOT and photogrammetry will be employed for deflection measurement.
- Quantify optical errors under calm and windy conditions. (9/30)
 - Simulating wind conditions is difficult. Team is consulting with Wind group for advice.
- Go/no-go on whether to achieve 20% cost reduction. (9/30)
 - Risk is low as work proceeds with Willbros.
- Go/no-go re: ± 1 mrad tracking and calibration. (9/30)
 - Risk is low based on the due diligence performed thus far. A raw signal-based tracking technique has been selected that, provided adequate design, should meet the accuracy goals.