



Heliostat Consortium Seminar Series

Brought to you by the Resource, Training, and Education (RTE) topic area

Abstract:

This seminar will provide an overview of the HelioCON components and controls (C&C) task. Dr. Armijo will review key gap areas within heliostat subcomponent design to assess both performance and reliability challenges for heliostats that range between 1.14 m² and 150 m² in reflective area. This research assesses current codes and standards, along with current test beds that could support functionality assessments across five key areas: 1. Conceptual Design, 2. Individual Component Development, 3. Heliostat Integration, 4. Mass Production and 5. The Deployed Field. Here, approaches are proposed for addressing engineering and administrative gaps in these areas based on previous and current research. Additionally, this work also assesses controls architectures within heliostat fields that employ both wired and wireless systems, and the key technical challenge areas that impact the levelized cost of electricity (LCOE) and heat (LCOH). As components and controls degrade or have other operational issues, the change in performance accuracy can impact CSP plant revenue as well as other opportunity costs. Here, HelioCON C&C survey results will also be presented to review key concentrating solar power (CSP) plant operational challenges related to C&C that consider both distributed control elements and central control systems. Finally, this work also reviews the consortium's findings and recommendations related to C&C CSP safety and security.

Bio:

Dr. Kenneth Armijo is a systems engineering staff member who leads molten salt and molten alkali metals R&D at the National Solar Thermal Test Facility (NSTTF). His research interests are in alternative energy technologies and sustainability, as they pertain to scientific and technological innovation, business and policy. Dr. Armijo holds a Ph.D. in Mechanical Engineering from the University of California, Berkeley with minors in Energy and Resources, and business credentials in Management of Technology from Berkeley's Haas School of Business. Presently, Dr. Armijo is the lead for the HelioCON Components and Controls Task, which is co-lead with Matt Mueller from NREL. His research in concentrating solar power (CSP) also consists of system design for high-temperature (>720 °C) thermodynamic and commercial R&D systems, employing ternary chloride molten salts and alkali metals (sodium) as the heat transfer fluid. He is the test site Principle Investigator (PI) for multiple U.S. Dept. of Energy (DOE) projects in CSP that also includes pumped thermal energy systems. His research has also consisted of falling particles for centralized concentrating solar receivers and solar reactors for industrial process heat applications and climate change mitigation technologies. He also leads research activities pertaining to solar Stirling Engine applications as well as for solar reactor R&D and high-flux materials characterization. Dr. Armijo also serves as a lead Test Director for high-temperature materials research for Aerospace applications, such as Re-Entry and Hypersonic vehicles.



Dr. Ken Armijo

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Systems Engineer,
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Host: Dr. Rebecca
Mitchell

Title: Heliostat
Components and
Controls

When: May 18th
1-2 PM MDT

Zoom:
<https://nrel.zoomgov.com/j/1610232256?pwd=QIZIYk5mNIRERFFyb3ZhdVA3SGduQT09>