

Technical Assistance Request

Data Collection for Automated Prediction and Detection of Solar Panel Failures

Our autonomous inspection robot will be designed to operate on industrial solar sites, continually scanning for infrastructure issues such as failed panels, hot panels, hot junctions, loose wires, and other quality-related issues that can affect overall system production. The capability of the system to be on site and operate every day can provide the ability to predict issues with components prior to failure and loss of production. To accurately predict component failure, panel and system component data will need to be collected and processed to direct the development of an appropriate sensor suite and data processing algorithms.

Solar panels typically show signs of issues via concentrated heat zones, which are detectable thermographically. Bad connections, cracks, and damaged wiring may also heat up providing signals of problems as well. The capability to detect delamination may be another source for identifying future failure of panels. To develop a useful predictive failure system, data from thermographic cameras and other sensors will need to be collected and processed in order to develop appropriate algorithms for detecting failures before they occur, as well as positive identification when issues have occurred.

We are seeking assistance from facilities with the capability to help our team collect data associated with components approaching and reaching failure modes such as cracking, delamination, short-circuits, cable damage, or any problem which may arise in a panel or system components which eventually result in system performance degradation or cessation. Beyond data collection, identification of possible sensors which may be employed for inspections beyond typical thermographic and 2D RGB cameras are of interest for assessment in the data collection process and potential inclusion in the system sensor suite.

Initial data collection is expected to occur at the assisting facility. Collaboration on potential automated algorithms for processing the data for defect prediction or detection is also a viable aspect of the program. First system prototypes may also be tested for effectiveness at the assisting facility for validation of the approach and total impact of the overall technology.