Thermography Inspection of 15MW of Module at Tilhar" – Location- Shahjahanpur, Uttar Pradesh

OBJECTIVE

- Solar panel inspection using AI-powered surveillance drones provides you quick and cost-efficient early detection of potential power degradation and safety hazards to minimize operational risk and protect the value of your assets. Our experts prepare independent third-party documentation to support you with any claims you may have.

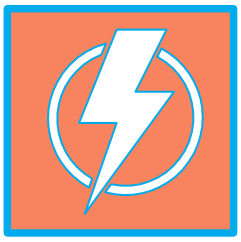
- We also provide an online platform on which to store digital data files for easy and instant access. Our inspection services help you reduce operational and maintenance costs by allowing targeted and more efficient ground inspections e.g. for Technical Due Diligence focusing on the findings.

- We provide you digital data and automated anomaly reporting with statistical clustering to allow for easy comparison and sensible optimization. We help you focus on the major issues to save you time and money. Regular inspections allow for progress monitoring and effectiveness of corrective actions assessments.

OBJECTIVE OF IR INSPECTION

- The primary objective of this IR/Thermal inspection is to find critical hotspots (high temperature zones) which indicate specific types of defects of various components of a Solar PV Module, the cause of such types of defects and to provide suitable corrective action to avoid further damage & ensure normal functioning of modules

SCOPE OF INSPECTION & METHODOLOGY



SCOPE

The scope of this project entails a non-contact infrared thermal inspection performed with the thermal sensor mounted on a UAV inspect thermal & visible anomalies on solar PV panels.

METHODOLOGY

This power plant was divided into Multiple geographical blocks and each block is converted as a part of report.

DATA COLLECTION

The Block was covered in multiple flights using FLIR Vue Pro thermal sensor mounted on a UAV – the flight path was optimized to enable the creation of thermal Ortho mosaic layer. The data collection process is explained in the following steps:

- The flight mission was designed for the specific layouts using compatible map files that contain the plants GPS boundaries.
- Image resolution & overlapped were specific at the time of mission planning. Less than 5cm Pixels is the GSD resolution. The degree of overlap between consecutive images is specified using frontal overlap & side overlap parameters. The values of these parameters are 90% & 90% respectively for thermal.
- Upon reaching the site, the visual & thermal drone were assembled and the connected to the smartphone via the link app.
- Upon the receiving the confirmation that the environmental conditions were within satisfactory levels the scan was carried out. Some key parameters that were considered were irradiance, wind speed, cloud cover and tome of the day. The parameters thresholds were considered as the prescribed by the IEC TS62446.
- The UAV then embarked on a near autonomous flight with minimal inputs from the pilots.

FAULT CATEGORY

Fault category will help you decide your next actions steps based on severity and impact of findings.

REMEDIATION RECOMMENDED FAULTS

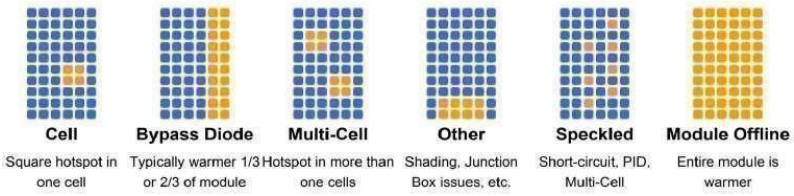
Modules with a high probability of causing system energy loss. The choice to remediate modules depends on anomaly density, replacement costs and replacement availability.

MONITOR & REMEDIATE FAULTS

Modules that pose a significant known energy loss or potential safety hazard on the site which require prioritized attention to recover energy loss and improve site safety

LONG-TERM MONITORING FAULTS

These modules have a low probability of causing extensive energy loss. Theses anomalies are unlikely to require remediation immediately but tracking the progression of anomalies over time is recommended.

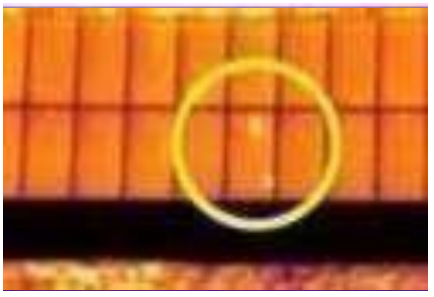


EXAMPLE OF ANOMALIES

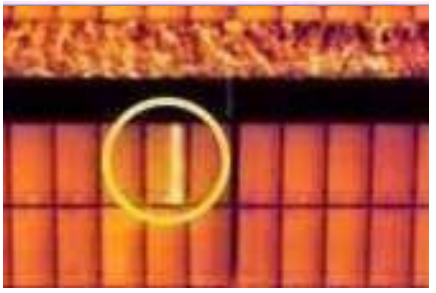
Below are visual examples of anomalies

Cell Hotspot

Multi Cell Hotspot

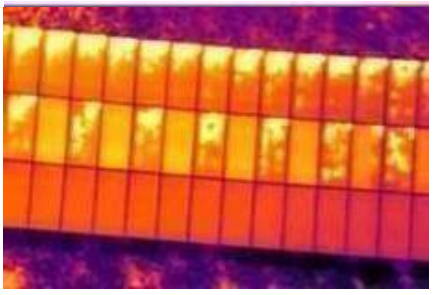


Bypass Diode

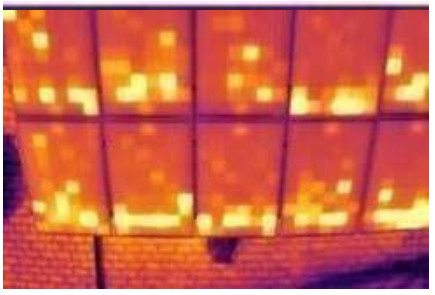


Power Mismatch

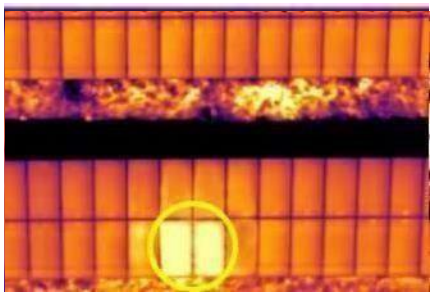
Speckled



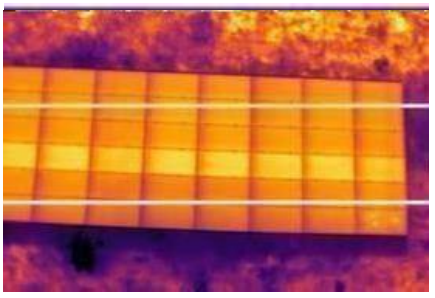
PID



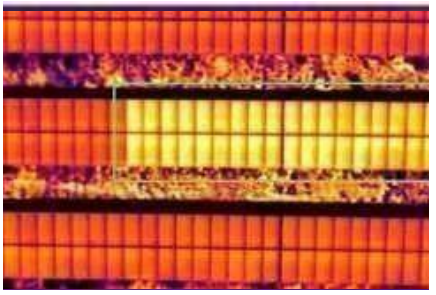
Module Offline



Partial String Offline



String Offline



RESULTS& INFERENCES

QUICK SUMMARY