

HOW CAN SOLAR OPERATORS ENSURE THEIR SINGLE-AXIS TRACKING SYSTEM IS ALWAYS OPTIMIZED?

PROBLEM

Solar tracking system misalignment leads to hidden energy losses. Current detection methods are imprecise or impractical.

SOLUTION

Avathon Industrial AI platform uses AI and machine learning to analyze tracker actuator, motor data, and inverter DC inputs.

OUTCOME

AI-powered tracker optimization and monitoring increases solar energy yields and reduces maintenance costs year-round.

The challenge with tracking systems is making sure they are optimized and working properly day after day.

If there is an undetected issue with the actuator functions or the electrical or computer system, this can throw the tracking system into misalignment—ranging from just a few degrees to many degrees or not even rotating at all—compromising daily power generation.

THE LIMITS OF COMMON SOLAR MISALIGNMENT DETECTION METHODS

To identify tracker row misalignment, operators have commonly relied on either visual cues from the field or analyzing the abundant data points imported from the tracking system.

Visual diagnosis of tracker alignment can identify rows that are significantly out of position, such as 'in stow' or facing the opposite direction. However, this assumes that someone is there to observe it. Dispatching technicians to check for tracking issues can be costly, leading to alignment issues that go undetected between visits to the site.

Minor misalignments can be more difficult to ascertain by the human eye, though, and visual cues do not convey whether or not the system is optimized per its operational parameters.

Looking for signatures of misaligned solar tracking systems within the voluminous and frequently imperfect solar tracking data presents challenges, as well. Identifying a single row out of alignment without good data management techniques and algorithms is difficult, time-consuming, and resource-heavy.

Without using an advanced asset management platform to import and organize the data efficiently, detecting misalignment using an in-house data monitoring process to catch signatures of misalignment is extremely burdensome for most operators—let alone creating methodologies to gain accurate and actionable insights into the performance of the system.

WHY MAINTAINING A HEALTHY TRACKING SYSTEM IS CRITICAL FOR TODAY'S SOLAR POWER OPERATORS

The angular position of photovoltaic modules relative to the sun's rays makes a big impact on electrical generation for a solar power installation. Single-axis tracking systems are excellent for increasing energy production compared to fixed-tilt solar sites—capable of increasing annual output by roughly 30%.

FIGURE 1: Normally behaving inverters compared to one with significant tracking issues (green).

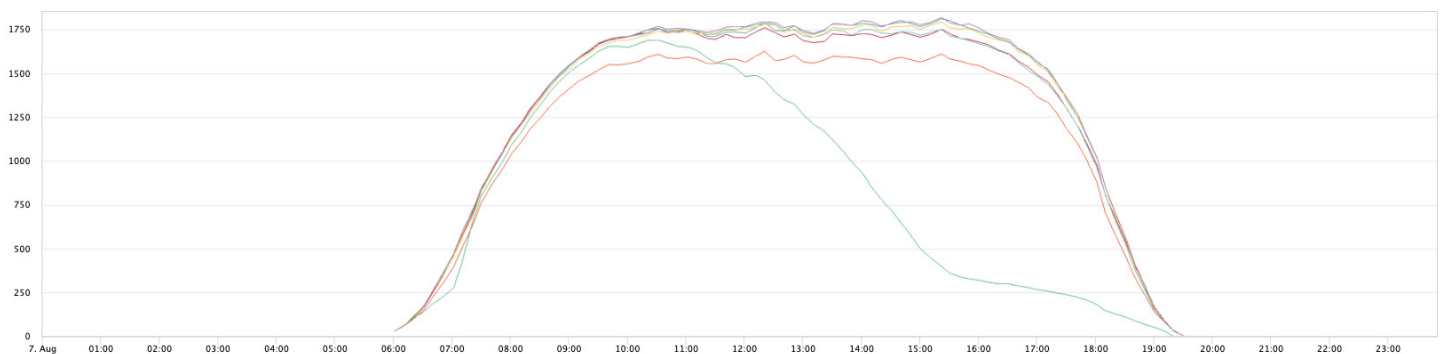
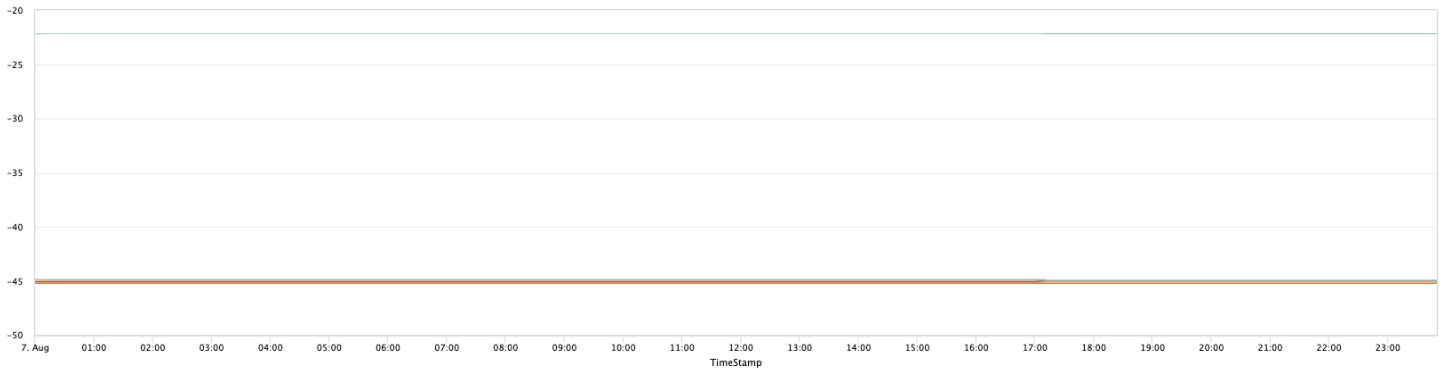


FIGURE 2: Tracker motor signals from the inverter in Figure 1 with tracking issues. Most trackers are stuck in the -45 (morning) position. One is stuck at -23. None appear to be following a proper tracking pattern throughout the day.



USING AN AI-POWERED ASSET MANAGEMENT PLATFORM FOR TRACKER OPTIMIZATION

Leveraging proven AI and machine learning algorithms built for demanding solar power industry challenges like optimizing tracking systems, Avathon Industrial AI platform solves the problem of monitoring and optimizing single-axis tracker alignment by automatically aggregating your tracker actuator data, motor data, and inverter DC input data and conducting deep analysis to detect any rows that need attention. More than that, it contextualizes the production loss associated with any misalignment. With increased insight, visibility, and automated tracker alignment notifications, your operators can optimize maintenance dispatches for the best ROI on a truck roll based on historical failure rates, weather projections, and energy pricing—reducing your maintenance costs. With the ability to find and fix solar tracker misalignment issues more reliably, you can increase solar energy yields and profits.

Industrial AI platform is the world’s first AI-powered asset management platform for renewable energy, enabling operators to

optimize the vast streams of data flowing from their assets to solve big challenges like tracker misalignment. Harness the power of AI and machine learning to ensure you’re always tracking in the most efficient manner for your specific site layout.

ABOUT AVATHON

Avathon, a leader in Industrial AI, extends the life of critical infrastructure while advancing the journey toward full autonomy. Avathon’s Industrial AI platform empowers commercial and government customers with scalable, secure, and value-driven solutions that enhance efficiency and resilience across heavy industry.

To learn more about how Avathon’s AI solutions can unlock the power in your data, visit www.avathon.com.