



raicoon autonomous operations center – changing the game of solar asset management

raicoon runs your PV plant on autopilot 24/7, finds every single fault, and never makes a false alarm. It tirelessly monitors the health and efficiency of your systems, and when faults do arise, has the right answer for what comes next.

Every fault is found. And there are no false alarms. Your energy output is increased on average by ~6% a year. And your engineers are freed from menial tasks. No more staring at screens, waiting for things to break. Now engineers can spend their time on more value-adding tasks — planning projects, handling improvements, or maybe constructing new plants.

With raicoon autonomous operations center (AOC) you can run your renewables on autopilot.

To put it lightly, we're beyond excited about what this means for the future of operations.

Bringing autonomous operations to renewable energy systems around the world enables us to use existing resources much better than they're currently used today. It makes existing systems highly efficient and much more profitable.

And most importantly: autonomous operations will accelerate the energy transition.



Not just another monitoring tool

raicoon AOC is not a monitoring tool. raicoon doesn't just present data for human engineers to base their decisions on. It actually makes those decisions for them. It processes data from a multitude of sources and makes decisions informed by that data.

The AOC detects faults and then makes correct and timely decisions as to what comes next. If there's a fix to make, the system creates a ticket and the task is automatically assigned to the correct person to do the job.

The result? Every relevant, measurable anomaly is detected – even the minor ones. Service quality is improved and fixes happen faster, which means less downtime. And the system is able to operate at peak performance, so your plants produce more energy and solar asset management becomes more profitable.

Autonomous operations – how does that work?

Data aggregation and sanitization

Modern renewable energy systems capture a vast amount of data. Data generated by installation sensors includes data about the environment, such as solar irradiance and temperature, and also about the installation itself, including orientation and energy output. All of these measurements are necessary to ensure energy systems run optimally. The problem is – the data compiled at renewable energy systems is often of poor quality and can't be used directly. This is where raicoon comes in.

The AOC aggregates the raw data from renewable energy systems, creates a copy, and then uses machine learning technologies to analyze, standardize, and – if necessary – correct the data so it can be used quickly and efficiently. There are many steps involved in this process, including interpolation, plausibility checks, offset error correction, outlier removal, timestamp correction, cross-validation over different sensors, and more.

The quality of this data is the key to ensuring systems run optimally. By sanitizing it, the foundation is set for fault detection and diagnostics, and thus – autonomous operations.

An automatic fault detection engine

The fault detection engine is at the heart of raicoon AOC. We got to see firsthand how much energy was going to waste due to inefficiencies while working in the field as operations and maintenance professionals. Figuring out a way to rescue that energy became our first priority – so we set our minds to determining how we could capture it. In doing so, we soon realized that sifting through and analyzing the flood of data produced by a PV system is not a job fit for a human.

What's the point of an engineer sitting and staring at monitors, when a computer can do the job with more efficiency? If we can free up engineers to do more value-add tasks, like planning projects and handling improvements, why wouldn't we?

So we got to work. The goal was to invent an automatic fault detection engine so we could finally detect even minor anomalies. The ones that don't seem to have a huge impact, but over time really add up to be a lot of energy and end up having a sizable financial impact.

We're quite proud of the fact that we were the first to create an error detection software that can claim to detect 100% of faults, while creating zero false alarms. This is a game-changer for operations! Our success in building this software made us see what is possible, and we got even more ambitious. Now the fault detection engine is at the heart of a system that is the first in its category: autonomous operations for renewable energy systems.

How it works

Because the engine is able to detect 100% of faults without creating false alarms, there's no longer a need for someone to monitor and confirm the data. The time this saves, and the accuracy it brings – the effect is huge. It takes an entire step out of the equation. Operations is now autonomous.



Some of the features that pull it all together

A multi-level smart ticket system that works for everyone in the value-chain

Although the system runs autonomously, it doesn't do away with the need for maintenance and repair when faults do arise. When the system detects a fault, it doesn't just make an alert. It analyzes the data surrounding the fault and makes a decision about what to do next. Then it automatically creates a ticket, and depending on the settings you choose, will either assign the ticket to the correct person to make the fix or alert the asset manager or O&M so they can assign it to the appropriate person.

It was really important to us that the smart ticket system works for everyone involved. We developed it so that asset owners are able to see what they need to know, while still allowing service providers to communicate with each other without fear of repercussions from their boss's bosses for saying or writing the wrong thing.

What's unique about our system is that fault characteristics are updated live within the ticket. This is a huge time-saver for the engineer because they have all the details they need right within the ticket without needing to check back, document what type of fault it is, and so on. And if a fault goes away, the engineer will see that, too.

It facilitates the needs of everyone involved. This is important because, with each ticket created, the machine learns a little bit more. Which means your system is continually optimizing.

A measurable and manageable service level agreement

Another benefit of the AOC is that you're able to vastly improve the level of your service quality. For O&Ms this means you're able to improve your own service quality and make yourself more competitive in the market. And for asset owners – you're finally able to manage your service level agreements.

In the past, measuring the parameters of a service level agreement has been notoriously difficult. But with the AOC these things are measured precisely and automatically. If an agreement is violated, an alert is sent out. The result: an increase in service quality, and a system that runs more efficiently.

An on-demand reporting tool

Creating reports is a hugely time-consuming task for engineers. And asset managers need a lot of them. The AOC is set up so that live reports are available at any time. If an owner or asset manager wants to go in and request a specific report, they can do so at their convenience.



The future of solar asset management and O&M

With the power of AI and machine learning, raicon AOC will help renewable energy systems gain on average an additional ~6% of energy output each year. Systems will be optimized so that PV plant portfolios can operate at peak efficiency, and the entire value chain will be more cost-effective.

Instead of outsourcing, asset owners will be able to keep operations in-house. Not only will they have more transparency into what goes on at their plants, they'll be able to gain back operational independence of their assets and of their data.

They'll also be able to manage components of their service quality they were previously unable to manage. With the AOC, these things can finally be measured. Asset owners will enjoy a range of information that had previously been inaccessible to them.

Operations and maintenance service providers will not only be able to reduce their internal costs by about 25% but also drastically improve the quality of their services so they can stay competitive in a market where the pressure to reduce costs keeps rising.

It's an incredibly exciting time to be involved in the renewable energy transition. If you're interested to learn more about raicoon AOC or about how autonomous operations can transform the efficiency and profitability of your PV plants, please reach out to us today. We'd love to answer any questions you have.