# 14x RoI in 12 months for HITEC Rotary UPS

## Executive Summary

A pre-existing vibration solution outfitted to a 1.1 megawatt HITEC Rotary UPS was indicating the need for frequent and expensive lubrication service. The customer desired an independent, data driven assessment of machine condition and justification for the frequency of service. Within 2 months of installation, VIE's MyVIE system revealed 3 key insights:

(1) Intervals between service have been extended, and random alarms avoided, saving the facility $36k/year/ equipment.
(2) MyVIE detected a machine outage hours before existing systems indicated a problem.
(3) The UPS had a minor imbalance. MyVIE determined that the issue was not degrading, and therefore could be deemed acceptable for the time being.

## About MyVIE

VIE's MyVIE solution provides a cost effective means to reliably assess machine condition and to predict upcoming maintenance and inspection needs. MyVIE's process-in-a-box provides everything needed to modernize and optimize a maintenance operation – hardware, connectivity, cloud analytics and an intuitive, condition and incident management app. Beyond improving operational effectives, MyVIE provides the governance solution that facilities need to remain in compliance with safety, regulatory and industry requirements.

HITECH Rotary UPS

## Problem Statement

Our customer operates a large, high-reliability facility requiring a continuous supply of electrical power. A HITEC Rotary UPS has been commissioned to enhance overall power reliability. The UPS is a highly sophisticated and physically large machine that requires detailed end-to-end alignment and careful operating observation.

The manufacturer has outfitted the machine with a number of wired vibration sensors monitored by a nearby console. The system is rudimentary in nature – only gross vibration levels are measured, and analysis is limited to comparing values to a maximum threshold. Furthermore, the data and information are essentially locked in a black box providing limited access to historical data. This prevents the customer from both trusting the system results or relying upon it to provide evidence and backup for key operating & maintenance decisions.

A key concern to the customer was the frequency of maintenance alerts related to four critical coupling points on the induction coupling. With the existing system, service alerts were being generated monthly causing the customer to schedule a 3rd party specialist to come on-site and conduct maintenance. The service was expensive, costing approximately $6,000 per incident plus administration and the risk of removing a backup system from operation. **The customer wanted to know once and for all whether all of this effort and expense was justified.**

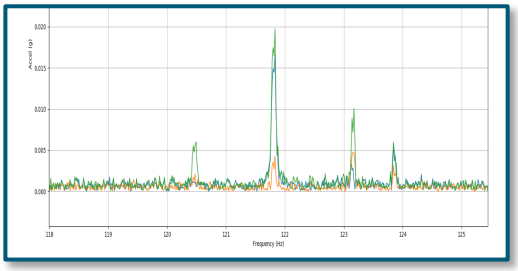
## MyVIE Installation

On site, two MyVIE sensors were epoxied to the UPS, one on either side of the induction coupling, near the bearing plates. While additional sensors may be added to other parts of the UPS in the future, these two allowed us to focus on the question of reliability of the induction coupling. A MyVIE wireless gateway was installed approximately 100 feet from the UPS and provided cloud connectivity for the MyVIE sensors. MyVIE was initialized and over the first few days, collected both high and low resolution baseline readings.

OPA sensor installation

# Key Results

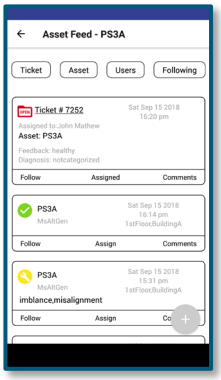
## Deep analysis, straightforward advice

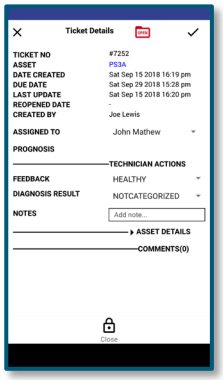


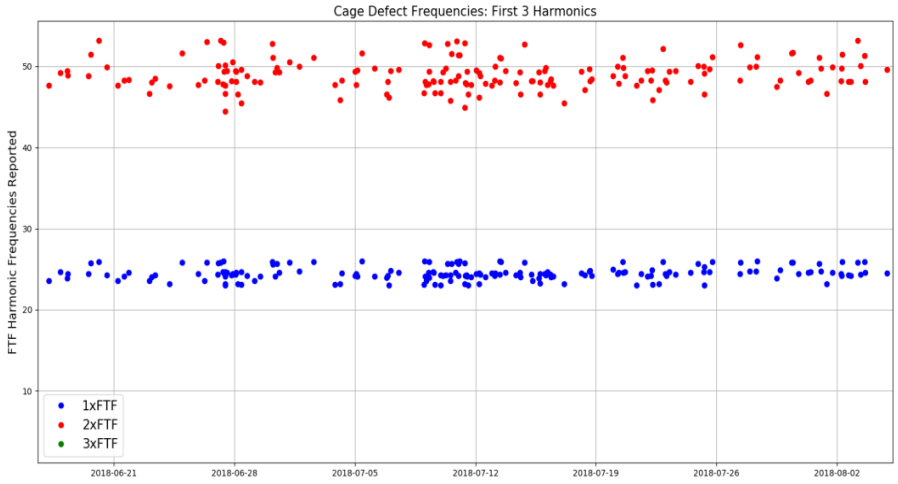
Following the baseline period, MyVIE revealed a number of key operating characteristics of the UPS. Firstly, vibration contributed by the inner rotor (5200 RPM) was more pronounced than by the outer rotor (1800 RPM). Secondly, both inner and outer rotors on the generator side showed high 2x axial vibrations. Finally, a relatively small but pronounced cage defect frequency (inner bearing) was detected.

From combination of these MyVIE analysis results, MyVIE concluded that the inner rotor was slightly misaligned relative to the inner bearing. This misalignment was creating an axial force whose load zone was reflected as cage defect frequency.

On MyVIE's management app, a yellow alert was signaled to the operator on asset PS3A indicating possible imbalance/misalignment. A service ticket #7252 was opened and assigned to a maintenance tech. Based on a visual inspection and review of our data logs, the issue was deemed to be within normal operating windows. This information was logged back into the MyVIE management app.




## Reduced Maintenance Costs

Over a two month period, MyVIE continued to monitor, analyze and trendline the UPS behavior across a number of key vibration metrics, including spectral noise PSDs and metrics associated with Fundamental Train Frequencies (FTF). MyVIE assessed this trendline data and concluded that the UPS was in normal operation with no early signs of degradation, wear or fault.

This was a key finding for the customer, as it provided quantitative proof that the maintenance alerts on the pre-existing solution was not based on any verifiable change in machine state.

Rather than performing a lubrication procedure on the UPS monthly, the customer can now extend the maintenance period to every 3 months, unless MyVIE were to indicate an emergent problem. At a cost of approximately $6k per service, the customer reported **a maintenance savings of approximately $36k/ year.**

## Instantaneous outage awareness

During operation over a weekend, MyVIE detected a UPS system outage, both preceded and followed by large vibration spikes. The outage immediately triggered an alert on the MyVIE app.

The app determined the outage to be 3.5 hours long and further established that vibration related metrics quickly returned to their normal operating range.

The power of MyVIE was demonstrated in the speed of detection and the ability to communicate this to all parties needing to be informed. Prior to MyVIE, the detection and communication of this type of unplanned downtime could often take several hours or more as there was no remote detection capability in service.