

Generator Prognostic/Diagnostic System (GenPDS)TM



Improving Reliability Through Health Monitoring and Predictive Maintenance

Connects Technology To Business...

Generator Prognostic/ Diagnostic System

The maintenance philosophy for generators prevailing today, is to run equipment until a failure forces the removal of the specific unit. This could lead to a catastrophic failure that renders the generator non-repairable, thus losing expensive equipment. Generator Prognostics/Diagnostic System (GenPDS)TM can detect and predict failures upfront thus avoiding such situations.



When integrated into an overall health management system, GenPDSTM will reduce substantially the risk of false ID of faults while achieving accurate fault detection, reduce maintenance costs, increase the availability of overall aircraft systems and improve their reliability in the execution of critical missions. Military and Commercial Aircrafts, Electric Power Generation and Automotive Industry will also benefit from the integration of the technology.

What can GenPDSTM do?

- **Diagnostics: Detects & Identifies Impending Generator Failure**
- **Prognostics: Predict Impending Faults & Avoid Catastrophic Failures**

Which technologies does GenPDSTM use?

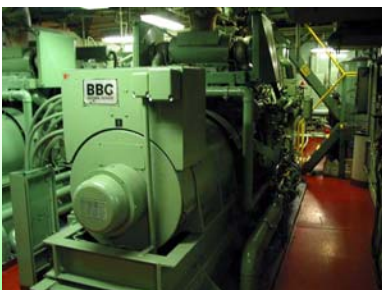
- **Feature Extraction**
- **Electrical Signature Analysis**
- **Fuzzy Neural Networks**
- **Confidence Prediction Neural Networks**

GenPDSTM

Health Monitoring System Benefits

- **Increase Reliability & Uptime**
- **Increased Safety**
- **Automated Monitoring**
- **Lower Cost**
- **Efficient Resource Management**

Generator System



GenPDSTM Software



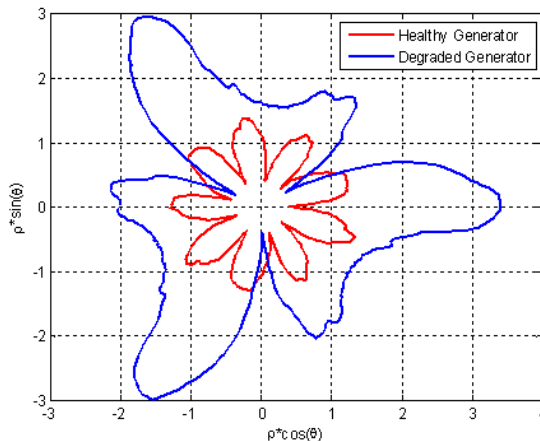
Maintenance & Logistic Personnel

DETECT!

The GenPDS software can monitor critical generator subsystems in real-time during equipment operation using vibration, phase currents and voltages sensor data. It incorporates neural networks, fuzzy logic and 1st principle models with Electrical Signature Analysis (ESA) based feature extraction to provide automated failure detection and identification with a high degree of confidence.

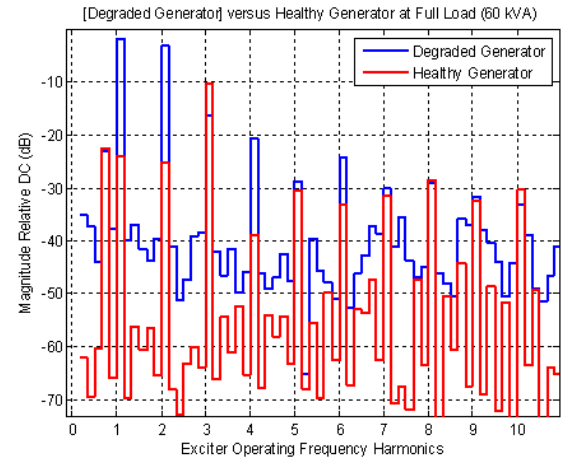
The key features of the diagnostic module are:

- **Fuzzy Neural Networks for Expert Knowledge Integration & Automated Data-driven Model Training**
- **Time & Frequency Domain based Electrical Signature Analysis**



Time-based ESA of Phase Voltages

**Generator Degradation
Detectable!**



Frequency-based ESA of Exciter Current

**Rotating Diode
Fault Identified!**

PREDICT!

GTC's development of data-driven algorithms based on neural networks as well as the physics based modeling has the ability to predict remaining useful life of degraded subsystems using features extracted from the generator's phase voltage and current sensor data.

- **Self-Learning Remaining Useful Life Models**
- **Confidence Prediction Neural Network**

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