TIGER®

KNOWLEDGE BASED GAS TURBINE CONDITION MONITORING

Comparison of TIGER® With A Historian

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SUMMARY

This document gives a short comparison of the main features of a typical historian product and how they compare with TIGER®.

In summary:

- TIGER has virtually all the features a typical historian does
- TIGER's data acquisition and storage strategy is much better for troubleshooting
- TIGER uniquely has continuous fault detection and diagnostics
- TIGER has many more graphical and report capabilities

COMPARISON

HISTORIAN CAPABILITY	TIGER CAPABILITY
Enables maximum efficiency, uptime and profitability	TIGER also enables maximum efficiency, uptime and profitability because these are standard benefits of condition monitoring
Useful for troubleshooting	TIGER is very good for troubleshooting. However a historian with dead bands on the input data is not actually useful for troubleshooting. The deadbands hide many critical data changes needed for troubleshooting. So TIGER is very good for troubleshooting but a historian is not.
Collects data from the gas turbine and balance of plant	TIGER has specialised diagnostics for gas turbines and steam turbines and can also acquire data from the balance of plant if digital data feeds are available.
Useful to debug valve problems	TIGER is excellent for debugging valve problems with its once per second resolution. Our experience is that historian products are not actually useful for debugging valve problems because the deadbands hide critical data changes.
Useful to debug electrical and mechanical problems	TIGER is an excellent tool for debugging all the sub systems of the gas turbine where data is available to TIGER. It has been used to troubleshoot many hundreds of turbine incidents. Historian products reduce the data and lose critical changes which makes them very poor for troubleshooting.
Acquires high resolution digital data	TIGER acquires the same high-resolution alarm data from the control system.
Acquires analog data	TIGER acquires the same analog data from the control system. TIGER stores the analog and digital data in the same place, where a historian stores it in two different places.
Built upon PI tools	TIGER has a highly integrated user interface designed to be easy to use by engineers. The PI tools are powerful but experience from many power plants is that they are too complex to use and require too much time to learn and set up.
Standard database query forms	TIGER has a mouse driven query interface to the diagnostics which include several types of filters providing a very quick and easy to use query mechanism into the turbine history.
Major goal: collect data	TIGER collects data and keeps it all.
Major goal: archive data	TIGER save the complete raw data Historian products reduce the data with deadbands and hence lose a lot of the detail that has been collected.

Major goal: look at data	TIGER has extensive graph and trend display capabilities in addition to a standard set of pre-configured turbine displays. This includes XY, multi time and distribution graphs. Typical historian only includes XY, graph and trend, not distribution or multi-time. The TIGER interface is much easier to use, reducing training time.
Major goal: analyse cause of problems and predict maintenance needs	TIGER is excellent at this and because it retains the full data history is far superior for troubleshooting.
The system is pre-configured for site	TIGER is pre-configured for a site and tuned to your turbine. Many configuration changes are easy to make.
Built on a third party toolkit	TIGER is designed for gas turbine monitoring and troubleshooting and comes pre-configured as a solution rather than a toolkit. Most plants don't have the time or skills to use the toolkit parts of a historian.
Interface to Mark VI	TIGER interfaces to the Mark VI
Interface to Mark V	TIGER interfaces to the Mark V
TIGER interfaces to the Mark IV	TIGER interfaces to the Mark IV
Can link in PLC and third party	TIGER can link to PLC and third party systems
Digital data stored in exception database	TIGER stores all data and digital changes so nothing is lost. Historian products reduce the data and detail can be lost.
Analog data stored in PI archives	TIGER stores all the data in one place versus a historian system which stores it in two different places depending on data type.
Retrieval with Web browser	Historian systems have very limited capabilities to retrieve data from a web browser. TIGER Remote View Nodes provide all the capabilities of a full TIGER system to a remote user enabling far superior remote troubleshooting.
Web browser limited to Alarm report, Cross Plot, Event scanner	All TIGER displays can be used remotely including graph, trend, multi-time plot, distribution graphs and diagnostics
Limited remote connection	TIGER Remote View Nodes provide the full TIGER capabilities remotely. This includes connections via dial up modem or corporate networks.
Built on Windows NT	TIGER use the more modern operating systems of Windows 2000 or XP. Windows NT is becoming hard to purchase and is virtually obsolete.
Mechanism to export data	TIGER can export data as text or Access format or Excel format
Amount of data stored depends on collection rate, deadbands	TIGER retains and stores all data at once per second, which is far superior for troubleshooting. Typical historian product data reduction strategies lose critical data for later troubleshooting. In addition, TIGER can work directly with data archived to CD or DVD, giving the ability to search or trend data across several years.
Limited data stored on line	TIGER stores more data online and can replay data and search from data archived to CD or DVD.
Hence reduces data stored	This is a problem for troubleshooting with a historian product. TIGER does not reduce data.
Scan data at 1/sec	TIGER scans data at 1/sec

High resolution digital data time tags	TIGER acquires high resolution alarm data with the time tags of the controller
Pre-configured displays	TIGER provides many pre-configured displays. The pre-configured displays in a historian product are limited. We know several customers that determined it would cost a lot of money for them to configure the displays in a historian product. TIGER has these same displays a standard, making the overall cost of TIGER lower.
Alarms time tagged at frame rate of controller	Alarms time tagged at the frame rate of the controller.
Sequence of events at millisecond time steps	Sequence of events captured with the time sequence and time stamps of the controller.
Record alarm changes with time tags	Records alarm changes with time tags. These can then be searched and also counted in a given time period
Keeps more data than old systems	TIGER keeps even more data than a historian system
Web browser access	Very limited by a historian system, full user interface via Remote TIGER View Node.
PI Process book graph and trend	The experience with many users is that these tools are very hard to use and most users never use them. The TIGER integrated interface is very quick and simple to use. Users with the option of TIGER or PI have always used TIGER.
PI Datalink to extract data	TIGER has standard export mechanism including an OPC server and 'data server' DLL embedded in Access and Excel
Strip chart recorder style of trends	The online TIGER can provide strip chart like trends spanning three days at a click of the mouse.
XY Plot of one pair or points	XY plot with multiple pairs of points
Event scanner	TIGER has better, mouse driven queries. TIGER can search much longer time periods and TIGER can report the number of times an event occurred in a given time period, This is invaluable for establishing that an alarm is becoming more frequent and anticipating how much longer before maintenance needs to be done, for example.
Process Trends	TIGER has an extensive trend system and automatically trends all input channels all the time. These are permanently stored for later use. TIGER can rapidly build trends for longer time periods such as weeks, months or even years. TIGER's trend system automatically calculates the maximum, minimum and average values for each part of the trend.
Reports in tabular form	TIGER has preconfigured reports available at the click of a mouse. Further report can be generated via the mouse drive query mechanism. TIGER displays, graphs and trends can be cut and pasted into Word for preparing complex reports.
Alarm history	In a historian system this is limited to a tabular listing. TIGER has ways to query and search and filter the alarm history.
Event /Trigger query	TIGER uniquely has event models which let you set up triggers for specific conditions, such as start-up, shutdown or key problem conditions. A click of the mouse is all that is needed to select them and or get a report. These can also be plotted on a multi time graph for comparison, for example to compare multiple starts.

TIGER CAPABILITIES THAT HISTORIAN PRODUCTS DO NOT HAVE

- TIGER performs continuous fault detection, identifying what is important in the way the turbine is operating. This provides a focused summary of what is important in the data rather than having to look at only graphs of the data.
- TIGER performs diagnostics. Rather than just the data from the turbine, you get the events in the data and generally how the events fit together to explain a turbine incident
- TIGER has multiple ways to query and filter the messages and alarms. This extends beyond the alarms generated by the control system to include all the fault detection and diagnostic messages in TIGER.
- TIGER can calculate and display historical distribution of data making it easier to understand what is normal for a turbine and identify changes in operating behaviour.
- TIGER calculates performance (if sensors available)
- TIGER has multiple remote connections mechanisms providing the full capabilities of TIGER to a remote location. This has proven invaluable for remote troubleshooting and support.
- TIGER can replay the gas turbine operation from a trend to investigate specific incidents
- TIGER can replay incidents from the diagnostic messages or alarm history to provide rapid troubleshooting
- TIGER has the ability to plot more data channels on one graph
- The TIGER graphs have considerably more functionality with an easier to use interface
- TIGER can have multiple graph and message windows displayed at the same time.
- TIGER can save multiple graph and window configurations, for example to have start up displays, shutdown displays, fuel transfer displays.
- The approach of typical historian products use dead bands to reduce the data. TIGER retains the raw data which greatly enhances the troubleshooting which can be performed.
- In TIGER, all the diagnostics and views are configured for you, so you don't' have to configure anything.
- TIGER tracks alarms and limits by turbine state, such as FSNL, Part Load, Full Load.
- TIGER has a real time Data Grid of input values, limits and turbine state.
- TIGER has a Nox model with 30 minute averaging
- TIGER has Multi time graphs allowing you to compare turbine operation or events at different times or days, for example to plot multiple start ups on the same graph.
- TIGER has Event models: for example to generate start up an shut down reports
- The TIGER Event Models: let you set up triggers for events and derive data
- TIGER has thumbnail graphs allowing the user to see graphical overview of many channels at the same time.
- TIGER can be used to cut and paste to prepare reports in Word

- TIGER can send email notification of critical events
- TIGER can generate sounds on specific alarms or diagnostics
- TIGER has a highly effective alarm server architecture for slow dial-up networks
- TIGER can display what is currently abnormal, from when it became abnormal, the current value and max value achieved.
- Graphs and trends can be called up from the display screens with a click of the mouse.
- Notes can be added to messages
- TIGER can change screen colours for better printing and reports, saving considerable printer ink.
- TIGER can display and integrate with full vibration systems including vibration based diagnostics and displays.

Feed back from a few customer who prefer TIGER over other historian products:

Site 1: Has had PI installed for many years. Now they always use TIGER rather than PI for troubleshooting and looking at trends. They started to build custom screens in PI, but gave up since it was becoming too much work.

Site 2: Considered whether to purchase PI or TIGER. They opted to buy TIGER, since once they calculated the man effort needed to configure PI it was much more expensive than TIGER. TIGER comes as a complete solution whereas the historian system would have needed a lot of configuration.

Site 3: Had a historian, but as soon as TIGER was installed, they stopped using the historian and always used TIGER for graphs, displays and historical data analysis.