What's New with ALERT 4.0

ALERT 4.0, including the TRIO Collector 4.0 application, is packed full of powerful, analysis features.

ALERT 4.0 is truly a powerhouse of analysis feature for the technical analyst and field engineers. It arms analysts with advanced tools to view dynamic data and fully understand the historical trends of machinery diagnoses. ALERT 4.0 includes a new layout with larger icons for easier use in the field. With more than 50 specific product improvements, these are some of the top features certain to benefit the majority of the ALERT users.

1. All new status views for plants and areas and improved status indicator flags for machines and locations gives users a better visual for the existing fault states of a machine. Status flags indicate the fault severity state, whether the machine has been reviewed by an analyst, and whether a machine or location has been tested or is due.
2. The History View section has now become the Analysis View with better visual indicators of the trend of the machine condition, the ability to filter notes, comments, and results, indications as to whether a machine information has been modified with the Event Tracker, had additional special tests, had new notes inserted, or has been flagged for a second opinion following the latest machine review state. This will give better visibility to the machine and the quality of results presented to all involved.
3. A new motor lookup database is now part of the MID / Machine creation wizard. With 15,000 motors available, the motor database will allow analysts to identify specific motor components for enriched vibration analysis.
4. Improved bearing database. With 75,000 bearing plus the ability for users to define their own bearings, ALERT 4.0 includes more search functions and bearing frequency calculations. This is beneficial to users who desire to annotate exact bearing frequencies in their vibration spectrum.
5. Simple communication between analyst and data collector is important in any program. ALERT 4.0 continues with Azima DLI's unmatched communication mechanisms. 4.0 includes a new analyst notes section which increases the efficiency and consistency in relaying additional tests or steps for data collectors in the field.

Note: ALERT 4.0 is backwards compatible with ALERT 3.60 systems via Replication. ALERT 4.0 does not support direct installation on DCX or DCA-60 nor does it support SFE or Load/Unload with DCA-50, DCA-31, or DCA-60. Legacy hardware only supported via Replication.

For the serious analyst, ALERT 4.0 includes many improvements to the way data is presented and analyzed. In addition to a new series of hot keys to speed up the analysis process and a more manageable graphic interface to present data, the top improvements of ALERT 4.0 include the following:

1. Enhanced visualization of dynamic data. A new graph navigator remote control allows analysts to quickly manage data views for high quality analysis. This remote control logically locates the common analyst functions such as cursor control, peak locator, unit / scaling switching, harmonic and sideband family locators, location progression, test date progression, and alarm screening.
2. ALERT 4.0 adds the powerful auto correlation displays of waveform data and circular waveform plots to greatly empower analysts' abilities to identify faults.
3. Bode data and Nyquist plots are now available and presented in both single and triaxial formats for advanced analysis capabilities.
4. New improved user preferences and header information give analyst more options to display spectral graphs and plots in units with better meaning to their program. This includes the ability to display waveforms as waterfalls, single or double triax, or as native, single, or double integrated values.
5. Improved orbit and circular plots displays will greatly benefit advanced vibration analysts for getting better representations of machine vibration and fault analysis.

In the field there have been 28 specific feature improvements to the TRIO Collector and Collector X applications. Designed to give the user faster and more meaningful information while still maintaining the simplicity of use the TRIO users have come to know. Some of the top improvements include:

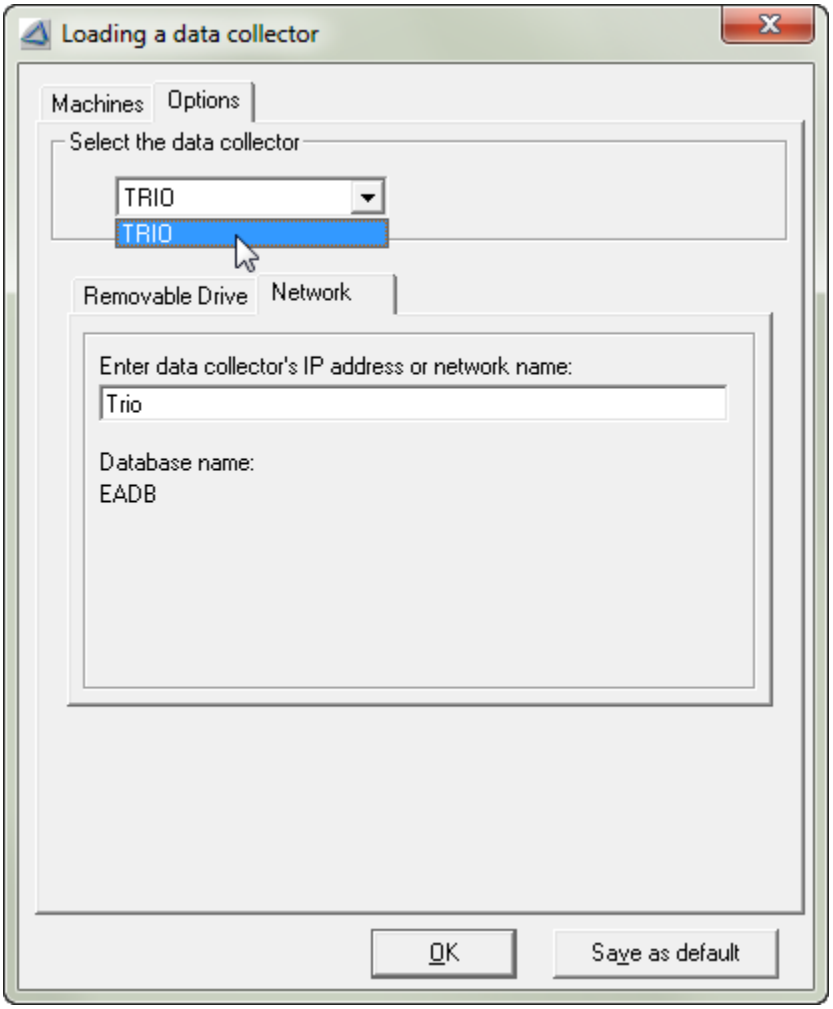
1. A greatly improved graphic viewer gives more information to users. This includes mosaic views, legends, and improved cursor controls.
2. New amplitude alarm triggers from waveform data, spectral data, and overall values.
3. Improved handling of mixed-sensor programs where users have both single axis sensors and triaxial sensors. This is common for machines that have permanently installed sensors which are accessed from a junction box. The M-12 plus single BNC adapter cable allows users to keep their triaxial sensor permanently connected and still collect data from the single channel sensor.
4. Along with the ALERT 4.0 software release, a new and improved TRIO DP-2 data processor is available which offers a full +/-10 Volt range. This will greatly benefit users who have loud or high impacting machines.
5. The new DP-2 comes in a new polycarbonate enclosure with improved ruggedness and durability.

ALERT 4.0: ExpertALERT, ExpertALERT Cloud-subscription, StandardALERT, ViewALERT

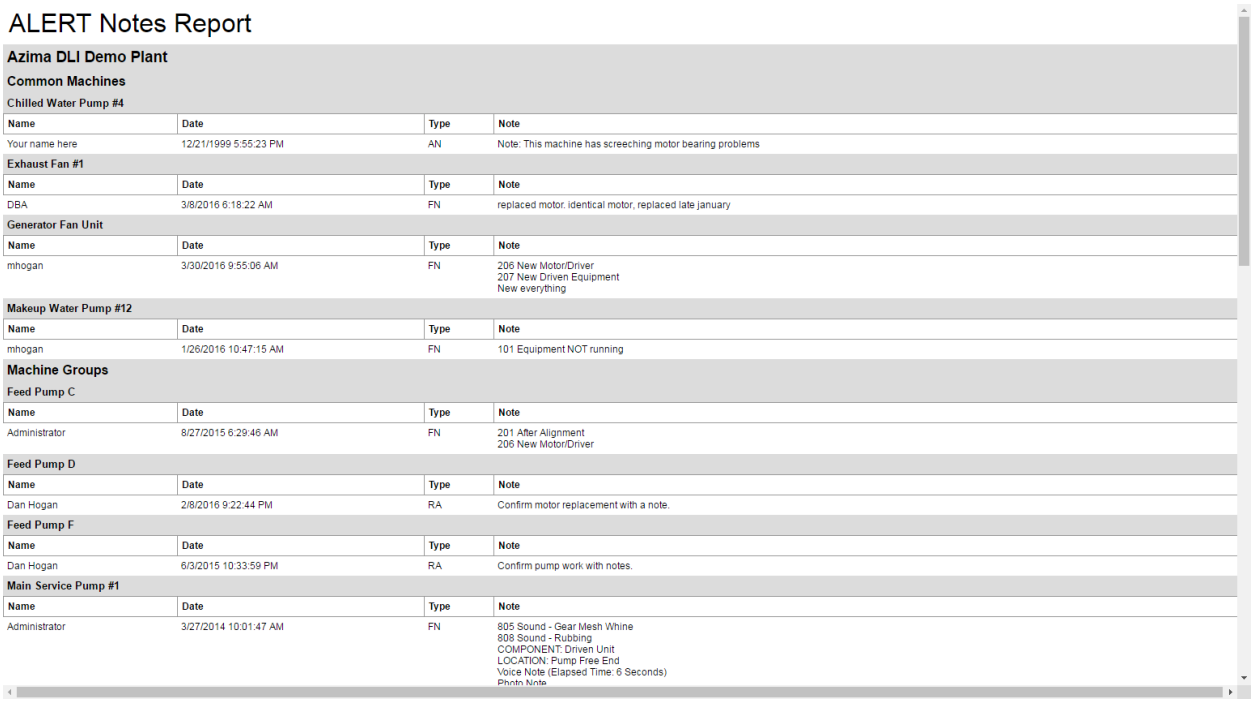
The user interface of ALERT 4.0 has an all new look. Though the buttons are larger (57% larger) with a more updated design, they are in the same locations as before as to no impact the habits of our common users.

Let's walk through a couple of the key changes here.

The thing to note in the **Data Collection menu** is that ALERT 4.0 does not support load/unload or survey file exchange with the legacy WATCHMAN Data Collectors such as DCA-31, DCA-50, or DCA-60. The only Data Collector which is supported through these communication methods is the **TRIO**. Customers with DCA-60s or DCXs can use replication to communicate, however, those platforms do not support the installation of ALERT 4.0. For replication, ALERT 4.0 is reverse compatible with DCX and DCA-60 using ALERT 3.60 through replication.



Added to the **Reports menu** now is a new selection to view or print a Notes Report. With the diverse system which separates analysts from data collectors, the notes are the best communication mechanism to ensure quality data and analytical understanding. Analysts will greatly benefit from this new report to see all machines which have notes applied.



ALERT Notes Report

Azima DLI Demo Plant

Common Machines

Chilled Water Pump #4

Name	Date	Type	Note
Your name here	12/21/1999 5:55:23 PM	AN	Note: This machine has screeching motor bearing problems

Exhaust Fan #1

Name	Date	Type	Note
DBA	3/8/2016 6:18:22 AM	FN	replaced motor. identical motor, replaced late january

Generator Fan Unit

Name	Date	Type	Note
mhogan	3/30/2016 9:55:06 AM	FN	206 New Motor/Driver 207 New Driven Equipment New everything

Makeup Water Pump #12

Name	Date	Type	Note
mhogan	1/26/2016 10:47:15 AM	FN	101 Equipment NOT running

Machine Groups

Feed Pump C

Name	Date	Type	Note
Administrator	8/27/2015 6:29:46 AM	FN	201 After Alignment 206 New Motor/Driver

Feed Pump D

Name	Date	Type	Note
Dan Hogan	2/8/2016 9:22:44 PM	RA	Confirm motor replacement with a note.

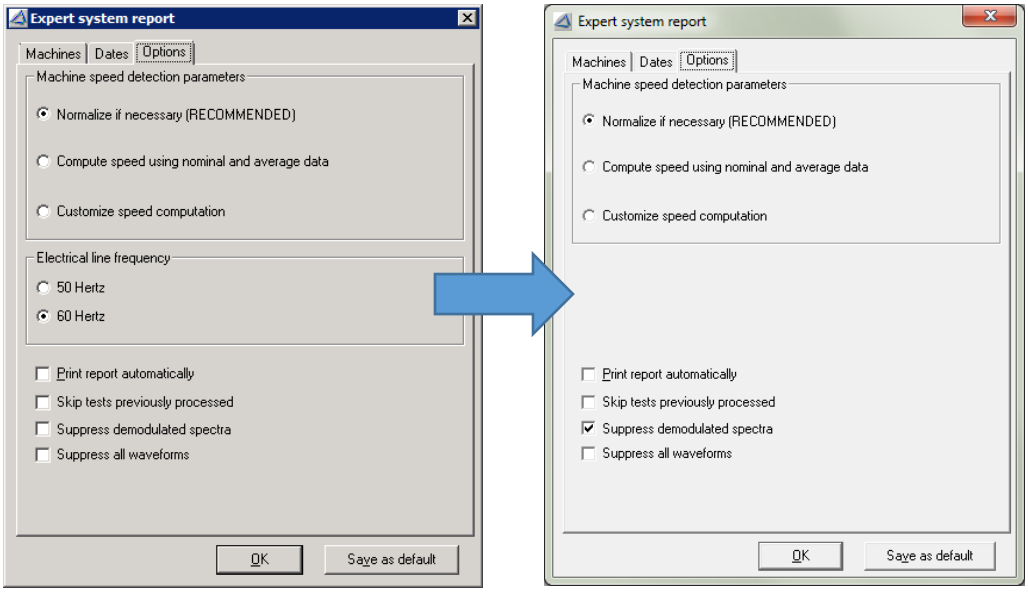
Feed Pump F

Name	Date	Type	Note
Dan Hogan	6/3/2015 10:33:59 PM	RA	Confirm pump work with notes.

Main Service Pump #1

Name	Date	Type	Note
Administrator	3/27/2014 10:01:47 AM	FN	805 Sound - Gear Mesh Whine 808 Sound - Rubbing COMPONENT: Driven Unit LOCATION: Pump Free End Voice Note (Elapsed Time: 6 Seconds) Photo Note

The **Expert menu** has a couple of changes to note. First, the option to select when a machine to be processed has 50 Hz or 60 Hz line current is now removed from the dialog.



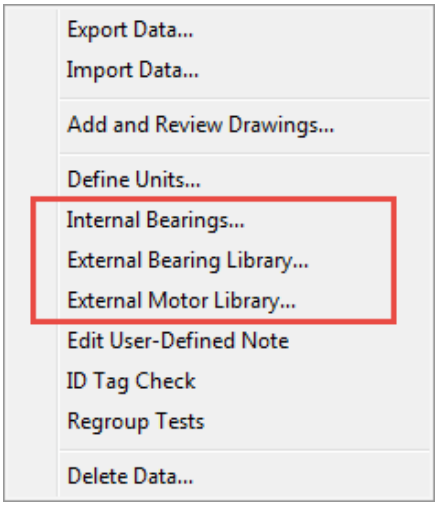
Line frequency is now set as part of the options at the **AREA** Level.

The second change to the **Expert menu** which should be noted for all users who connect to the WATCHMAN Data Center is the option to Quick Review. This allows users to blanket review all machines of a certain priority state. So how is this used in application? Consider a database which is relatively mature, most MIDs have a healthy average baseline and the system is running efficiently with the expert automated diagnostic engine. Data arrives, the expert system reviews, and the analyst has a good trust in the diagnostics. As always, there needs to be a review to ensure the accuracy as machines should never be shut down or repaired based solely on the automated system. But, with a mature average baseline, healthy machines need only a very quick glace to ensure the machine was running and that the data is valid. An analyst can do a very quick scan through the data to ensure this and then with one action, mark all of those machines as reviewed. This allows the analyst to then focus on the diagnostics of the machines which have serious or extreme problems.

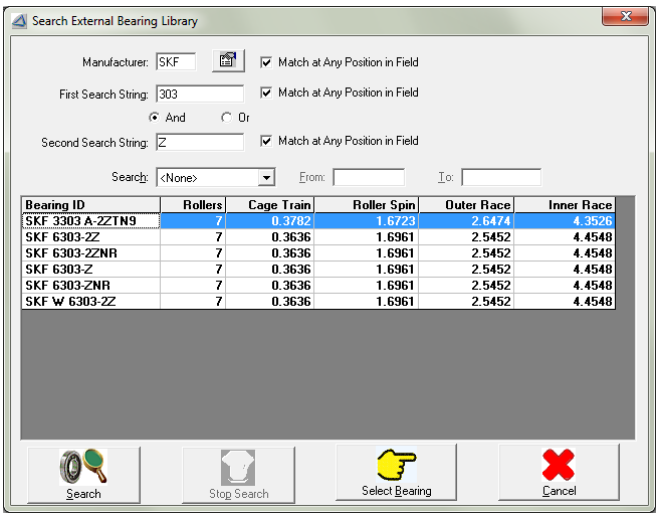
ALERT 4.0 has many new rules that apply to the diagnostic engine. These include setup and diagnostics of variable frequency drives and new peak screening tools for machines with impact demod waveform.

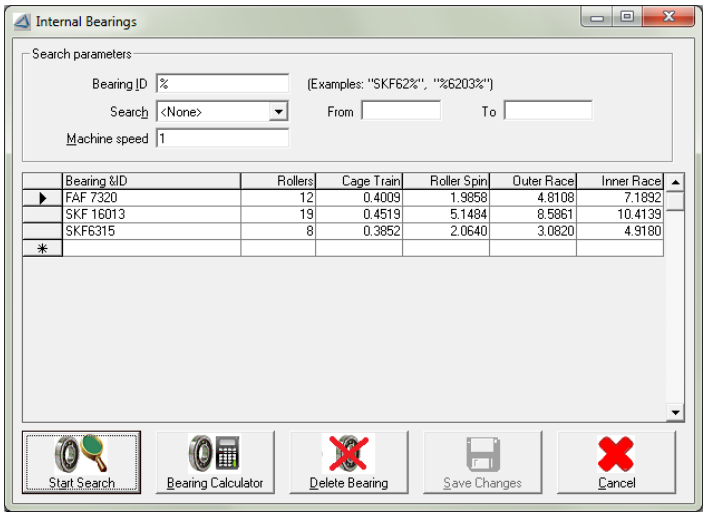
In the **Utilities menu** there is now better tools for managing both the Internal Bearings Library, the External Bearing Library, and the all-new Motor Library.

Internal bearings are bearings that are added or edited by the end users; bearings that are unique to the plant. The external bearing library is a separate bearing database that is installed with ALERT that contains about 75000 bearings for use in your analysis. Both selections here in the menu provide new tools for searching for these bearings.



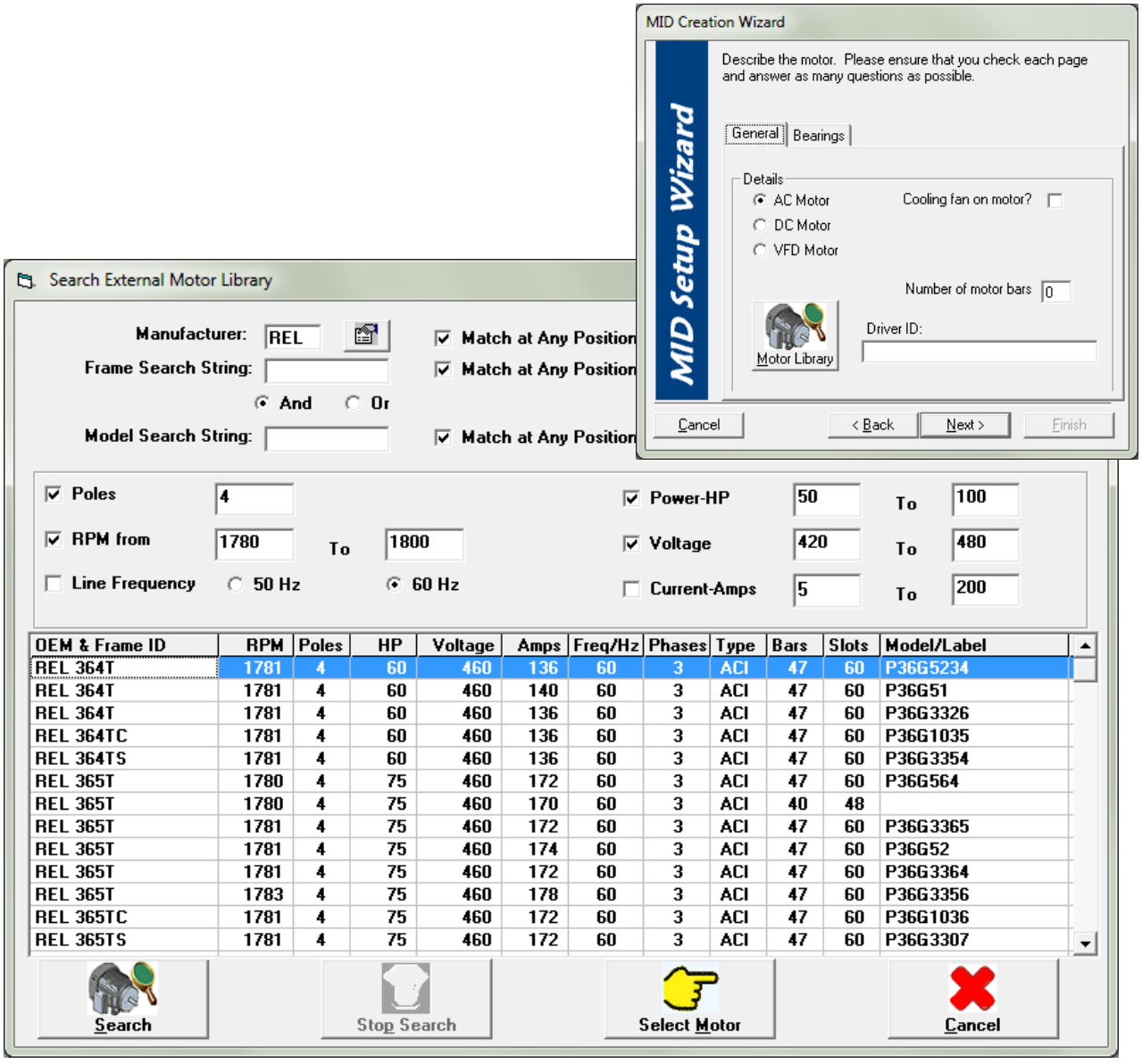
ALERT 4.0 includes more search functions and bearing frequency calculations. This is beneficial to users who desire to annotate exact bearing frequencies in their vibration spectrum.





A new motor lookup database is now part of the MID / Machine creation wizard. With 15,000 motors available, the motor database will allow analysts to identify specific motor components for enriched vibration analysis.

Creating motor assets in ExpertALERT will present a motor lookup to users to help them understand the driven component forcing frequency. By searching a couple of strings such as manufacturer and model or frame, the user can select an applicable motor to insert as part of the setup. Detailed searches can also be made from fields such as poles, RPM range, line frequency, horsepower, voltage, and current. For understanding motor bars and slots, this database will definitely help analysts identify electrical vibration.



Also new in the setup is the ability to select variable frequency drive motors as its own unique type of machine. This will apply new rules for diagnosing these assets.

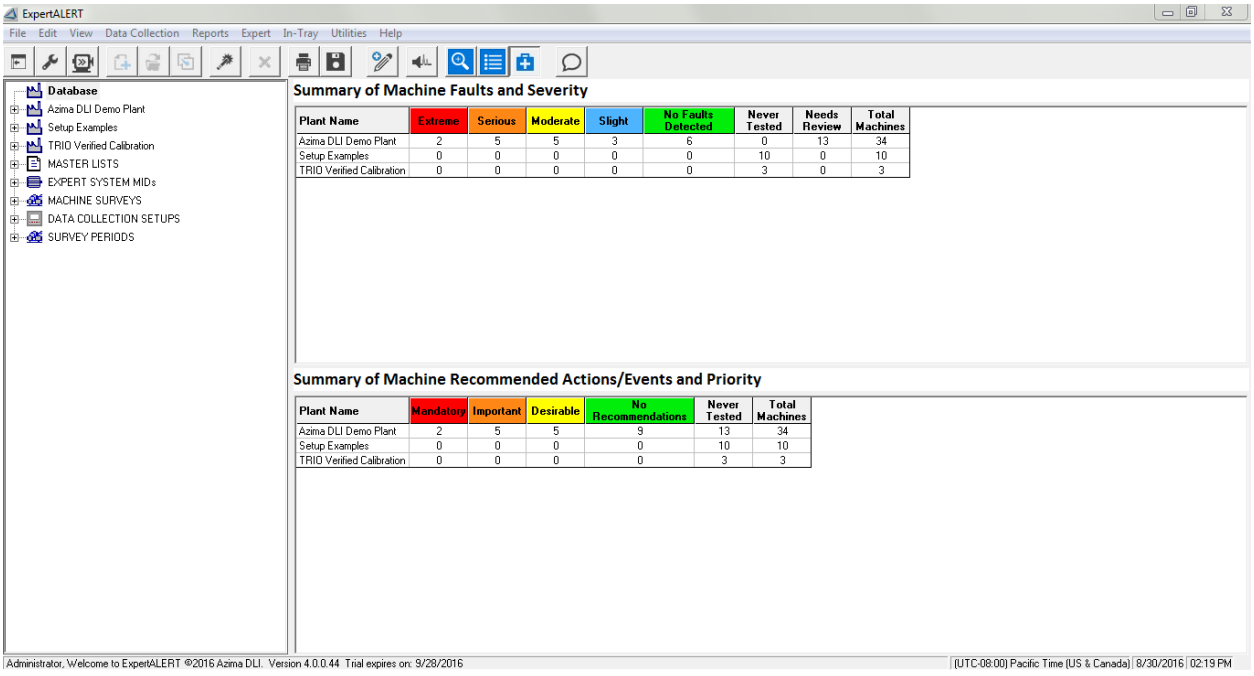
ALERT 4.0 Toolbar

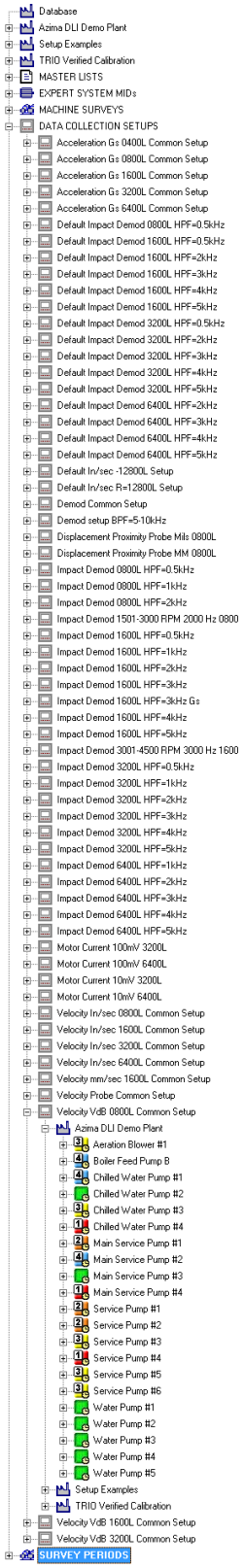
The buttons in ALERT 4.0 have a new look and better sized (57% larger than in 3.60) but mostly function the same. Some key things to note is they will gray out or disappear completely depending on the location in the tree. This helps to avoid confusion and increase user efficiency.

One change includes the pop-up tree toggle. This function would pop up the tree when it was toggled closed. With monitors sized wider than in the past, this function was no longer needed. All other buttons are the same as before.

Another change to note is that the History view button is now called **Analysis View** and provides significantly more details to aid in the understanding of machine trends and activities that happen between previous analysis and current data arriving into the database.

The **navigation tree** has three significant changes. First is the Database top level. This Analysis View level of the database gives users a quick understanding of their overall program.





Next area of improvement is the Data Collector Setup section. There are more common setups provided out of the box. Also, ALERT now displays a list of machines which utilize those setups as part of the machine or test location's setup.

The final area to note is the main content pane of ExpertALERT. Aside from the new graphing functions, the most impactful change comes from the **Analysis View**. When looking at the Database level, Plant level, or Area level the user will get high level information about the section status.

Database Level:

Summary of Machine Faults and Severity

Plant Name	Extreme	Serious	Moderate	Slight	No Faults Detected	Never Tested	Needs Review	Total Machines
Azima DLI Demo Plant	2	5	5	3	6	0	13	34
Setup Examples	0	0	0	0	0	10	0	10
TRIO Verified Calibration	0	0	0	0	0	3	0	3

Summary of Machine Recommended Actions/Events and Priority

Plant Name	Mandatory	Important	Desirable	No Recommendations	Never Tested	Total Machines
Azima DLI Demo Plant	2	5	5	9	13	34
Setup Examples	0	0	0	0	10	10
TRIO Verified Calibration	0	0	0	0	3	3

Plant Level:

Summary of Machine Faults and Severity

Area Name	Extreme	Serious	Moderate	Slight	No Faults Detected	Never Tested	Needs Review	Total Machines
Uncommon Machines	0	3	0	0	0	0	0	3
Common Machines	1	1	1	0	3	0	4	10
Machine Groups	1	1	4	3	3	0	9	21

Summary of Machine Recommended Actions/Events and Priority

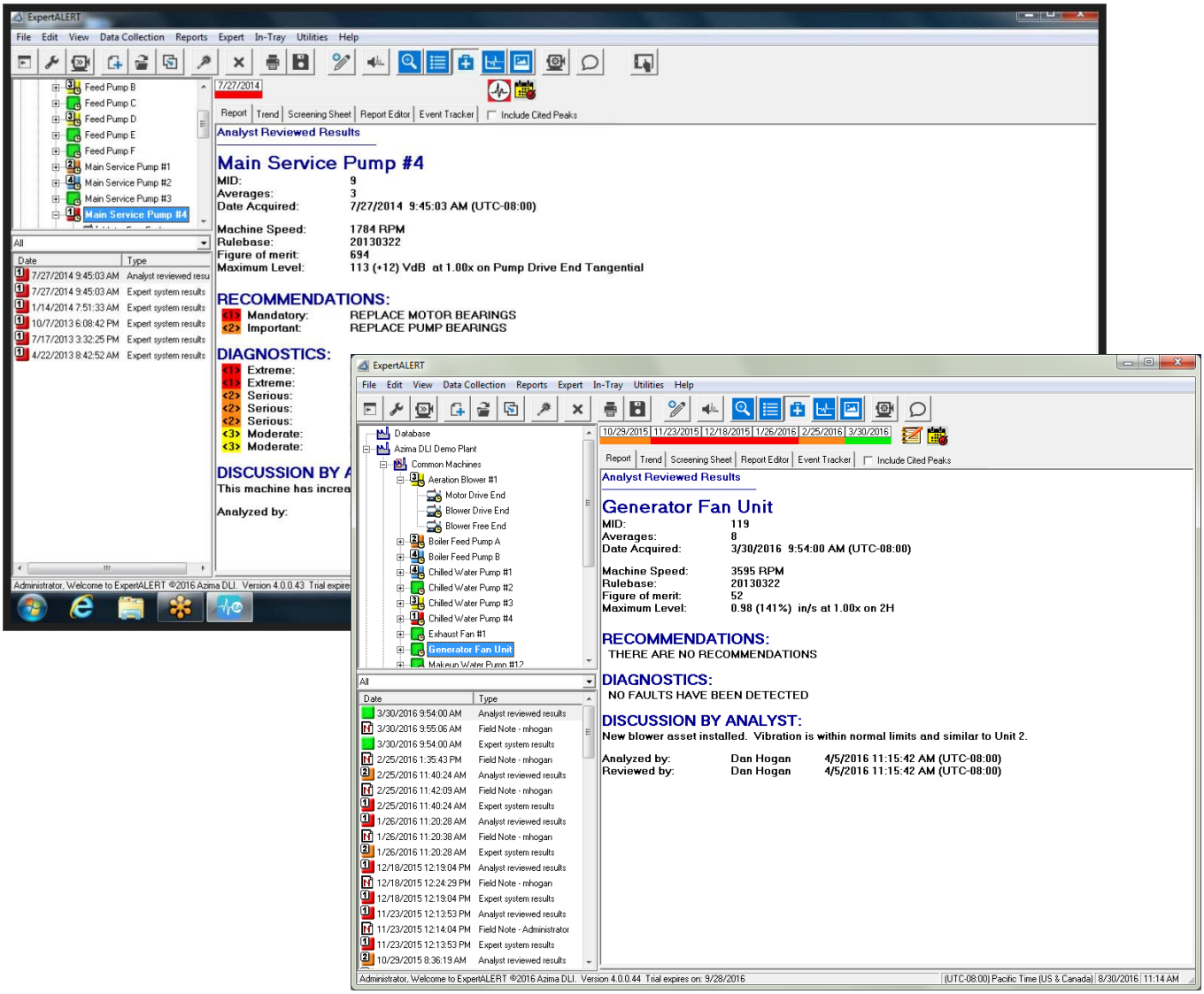
Area Name	Mandatory	Important	Desirable	No Recommendations	Never Tested	Total Machines
Common Machines	1	1	1	3	4	10
Machine Groups	1	1	4	6	9	21
Uncommon Machines	0	3	0	0	0	3

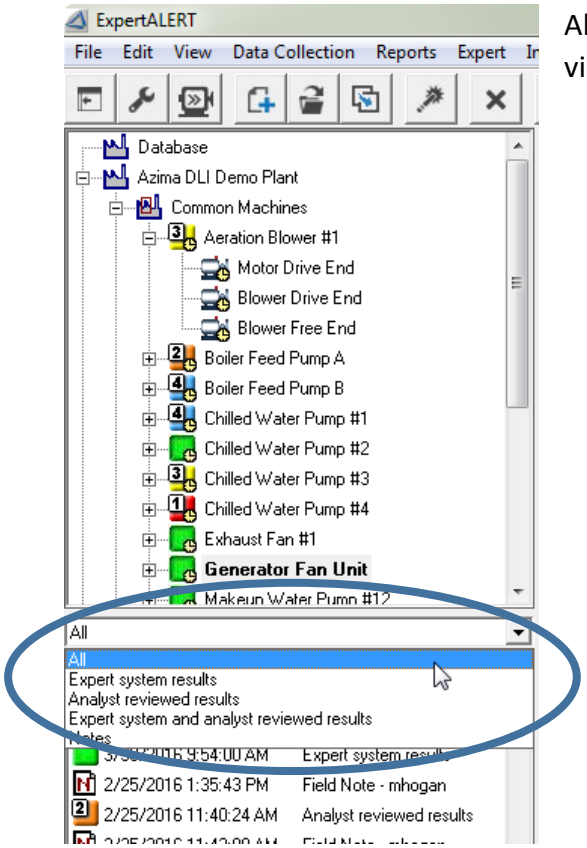
Area Level:

Summary of Machine Faults and Severity

Machine Name						
Chilled Water Pump #4	3/18/2016	8/24/2015	4/21/2015	1/24/2015	8/12/2014	6/18/2002
Boiler Feed Pump A	3/18/2016	10/10/2015	9/8/2015	8/14/2015	7/9/2015	7/1/2015
Aeration Blower #1	7/26/2010	4/13/2010	1/13/2010	10/7/2009	7/17/2009	
Exhaust Fan #1	4/8/2016	3/8/2016	2/11/2016	1/15/2016	12/3/2015	11/13/2015
Generator Fan Unit	3/30/2016	2/25/2016	1/26/2016	12/18/2015	11/23/2015	10/29/2015
Makeup Water Pump #12	3/30/2016	12/18/2015	11/23/2015	5/1/2015	3/26/2015	11/24/2014

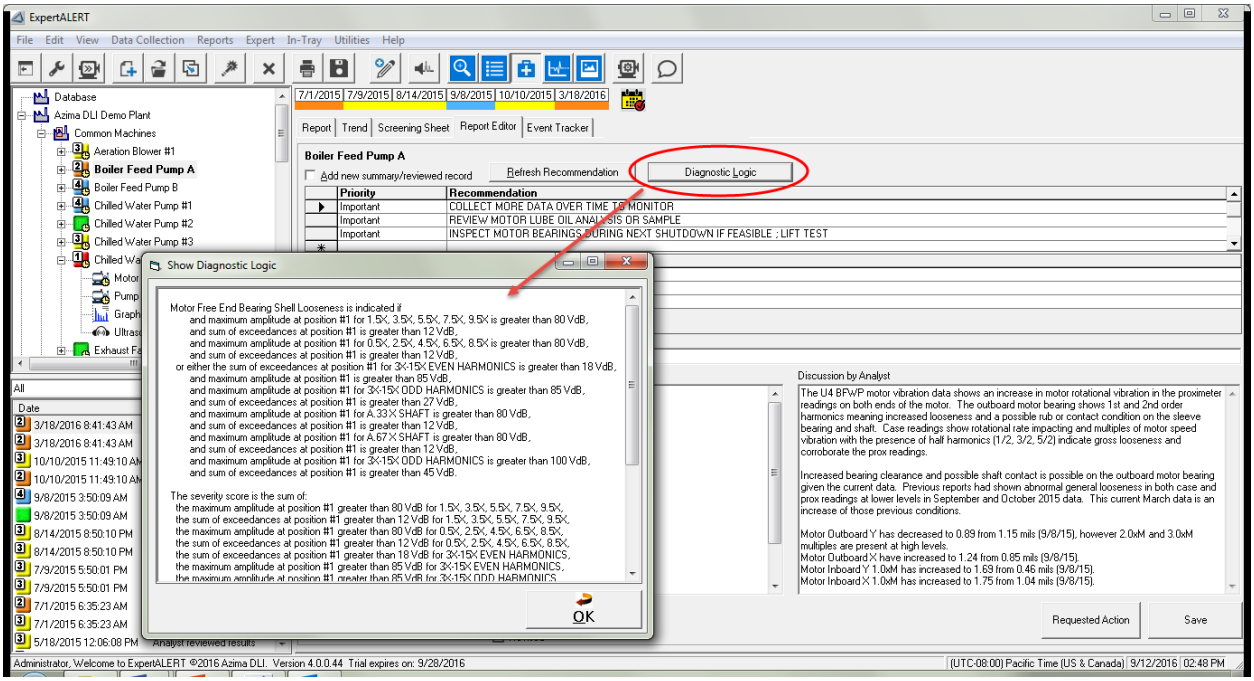
When at the Machine level, the top view presents the historical trend of event of the last six reviewed results as well as status indicators as to whether the machine has field notes or event tracker entries. This helps an analyst understand what other factors may be contributing to the machine's health for at-a-glance diagnostic information.





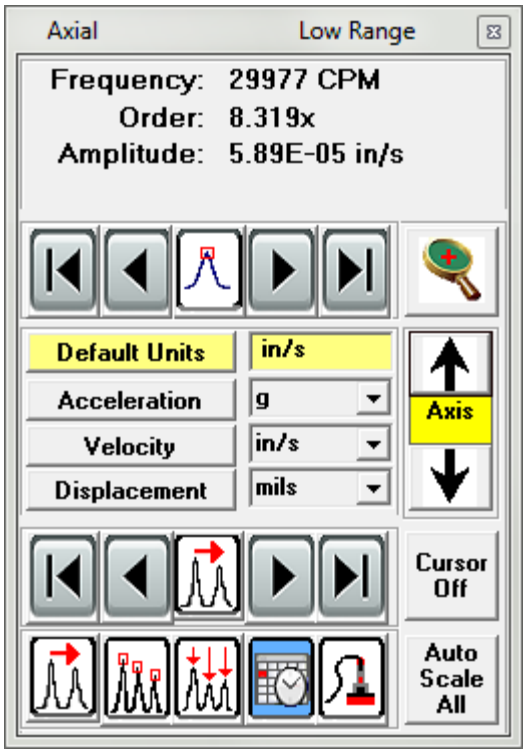
Also, in the **history window**, the user can filter what is visible to help increase the efficiency of the analyst.

For the serious EA analyst, users can dive deeper into the diagnostic rules which comprise the automated result.



Graphing Toolbar

The major area of change will be noticed when using the graphing functions of ALERT. There were major changes here to accommodate more advanced and power users of the software.



To scrub though volumes of data two features have been added. The first is all-new hotkeys functions which will allow for common functions to be performed via keystrokes. The second is a remote control which puts common functions and advanced techniques into a common location separated from the main application window. Users with large screen will appreciate the remote and the ability to go through data without requiring lots of extraneous mouse movements.

Major changes that will be noticed by existing users include:

The location of the Demodulation data is no longer part of the data types but now part of the range selection. When looking at Spectrum, for example, you will see Low Range, High Range, and Demod Range as options. When looking at Waveform, again Low range, High Range, and Demod Range as options. This is dependent of collecting Demod Spectrum or Demod Waveform as part of the machine location setup.

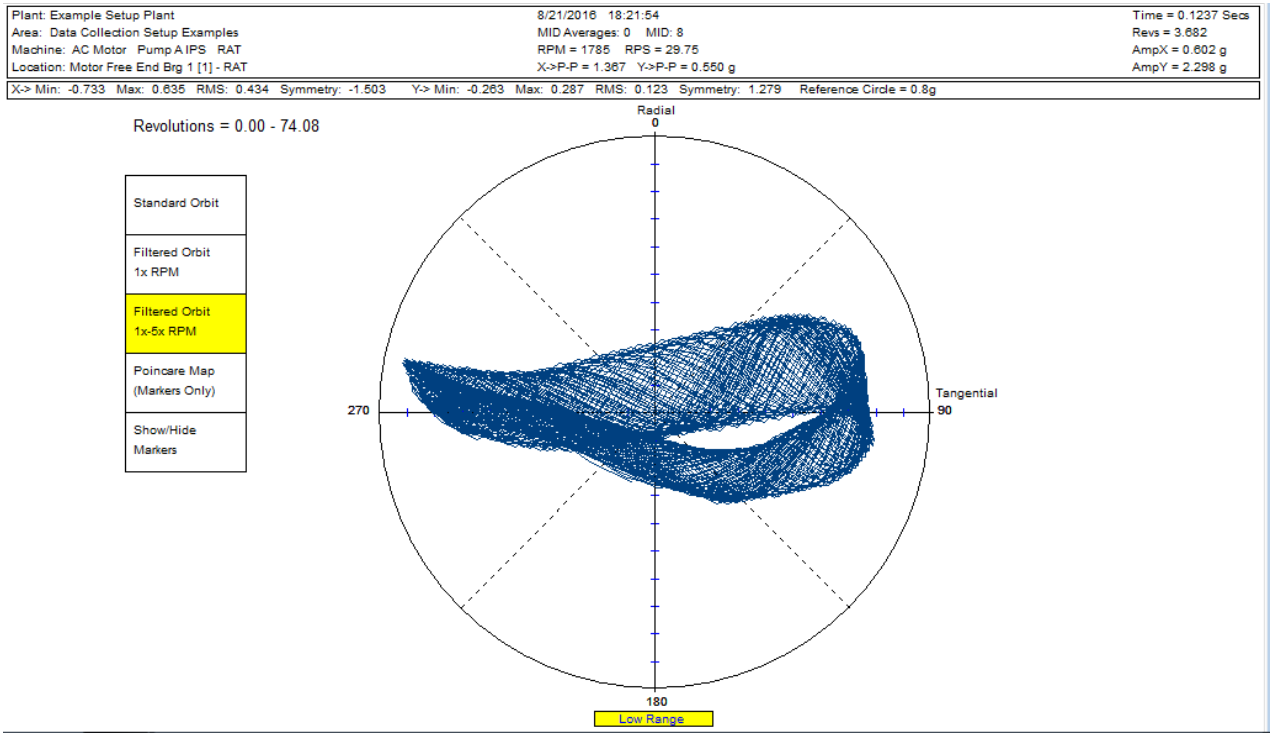
When looking at **Spectrum**, there are a few changes to how to display data. First is the layout. This used to be a toggle between overlay and waterfall, it now offers single graph with separate selection for average overlay, waterfall of all related data, and overlay of all related data. These all function independent of the average baseline overlay.

When looking at **Waveform**, there are new formats for how this will be displayed. Single, triax and double triax, and waterfall displays are now available, you can select orbits with more options, and entirely new are single and triaxial circular graphs.

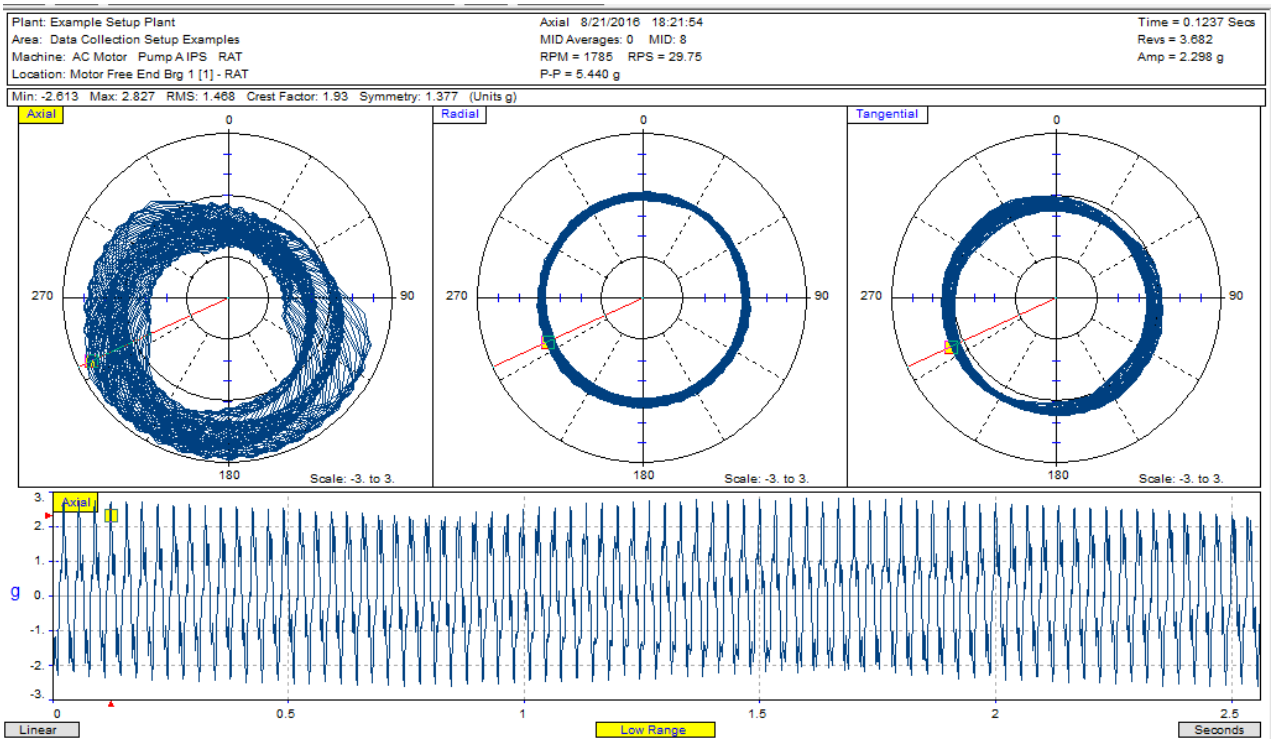
New improved user preferences and header information give analyst more options to display spectral graphs and plots in units with better meaning to their program. This includes the ability to display waveforms as waterfalls, single or double triax, or as native, single, or double integrated values.

New data displays include:

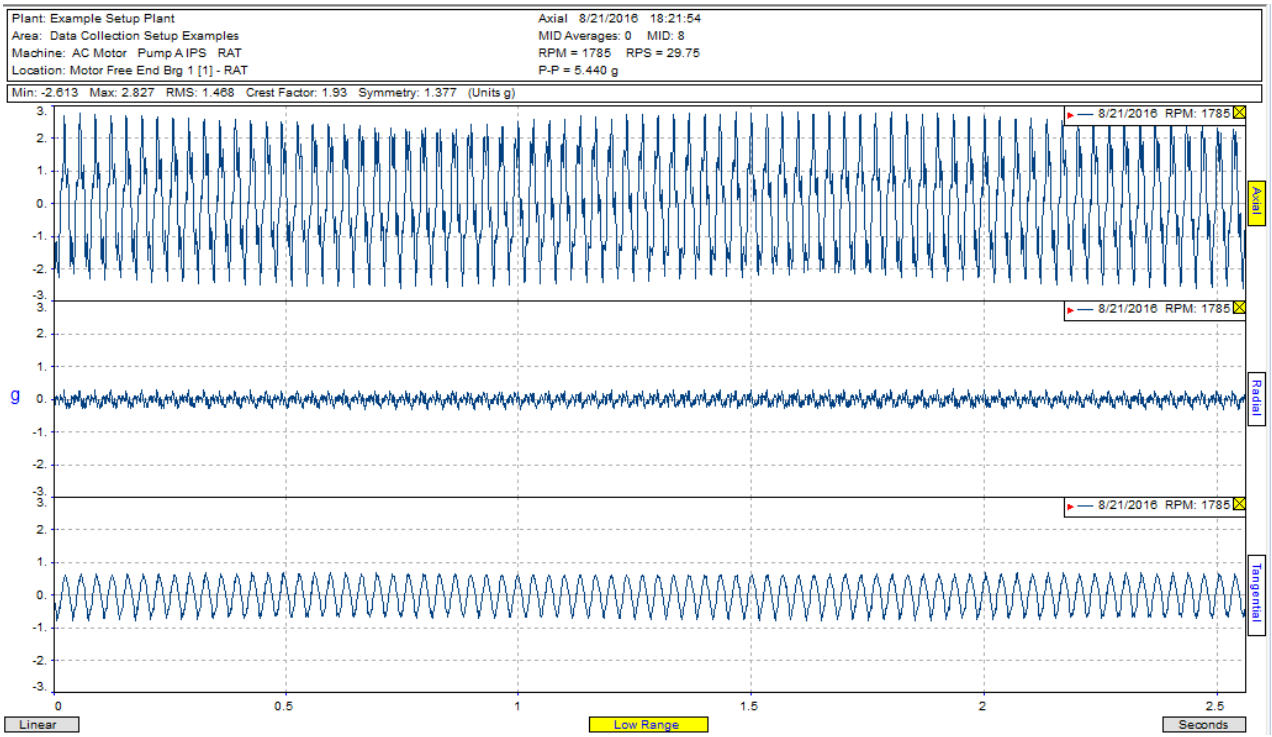
Filtered (1x-5x) Orbit of Acceleration Data:



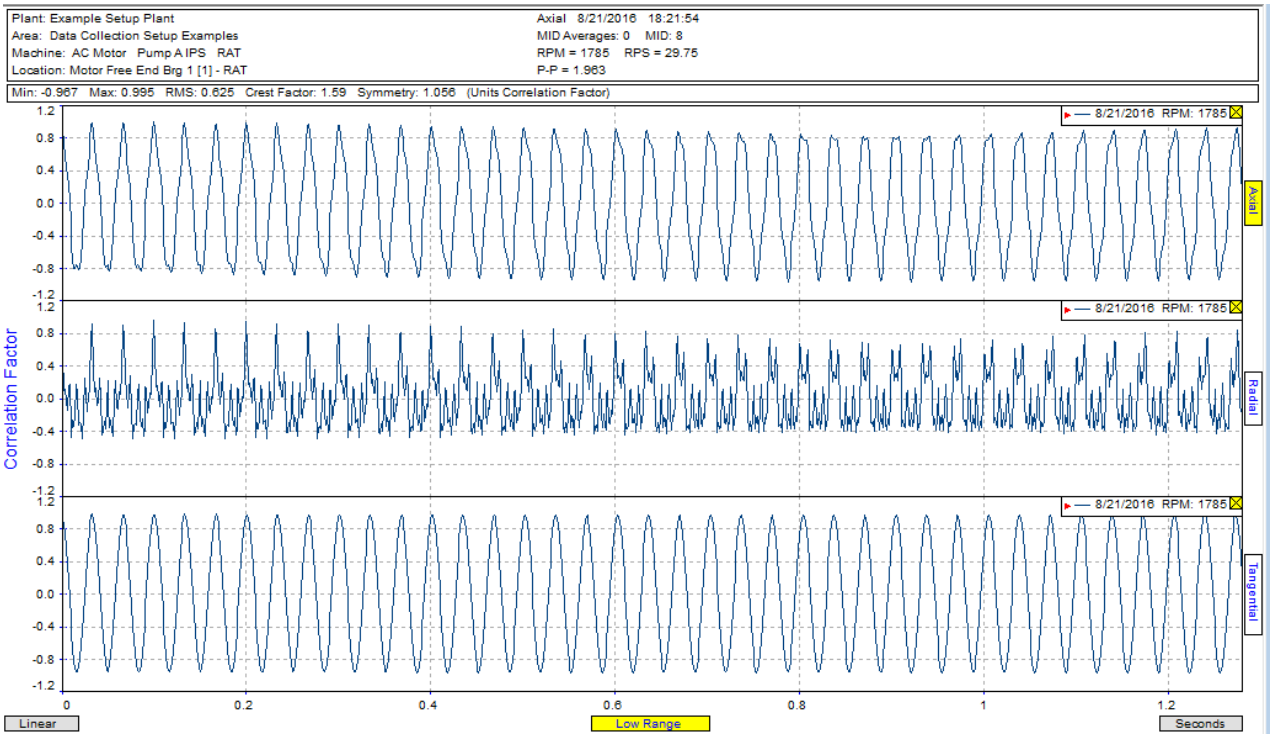
Triaxial Circular Waveform Plot:



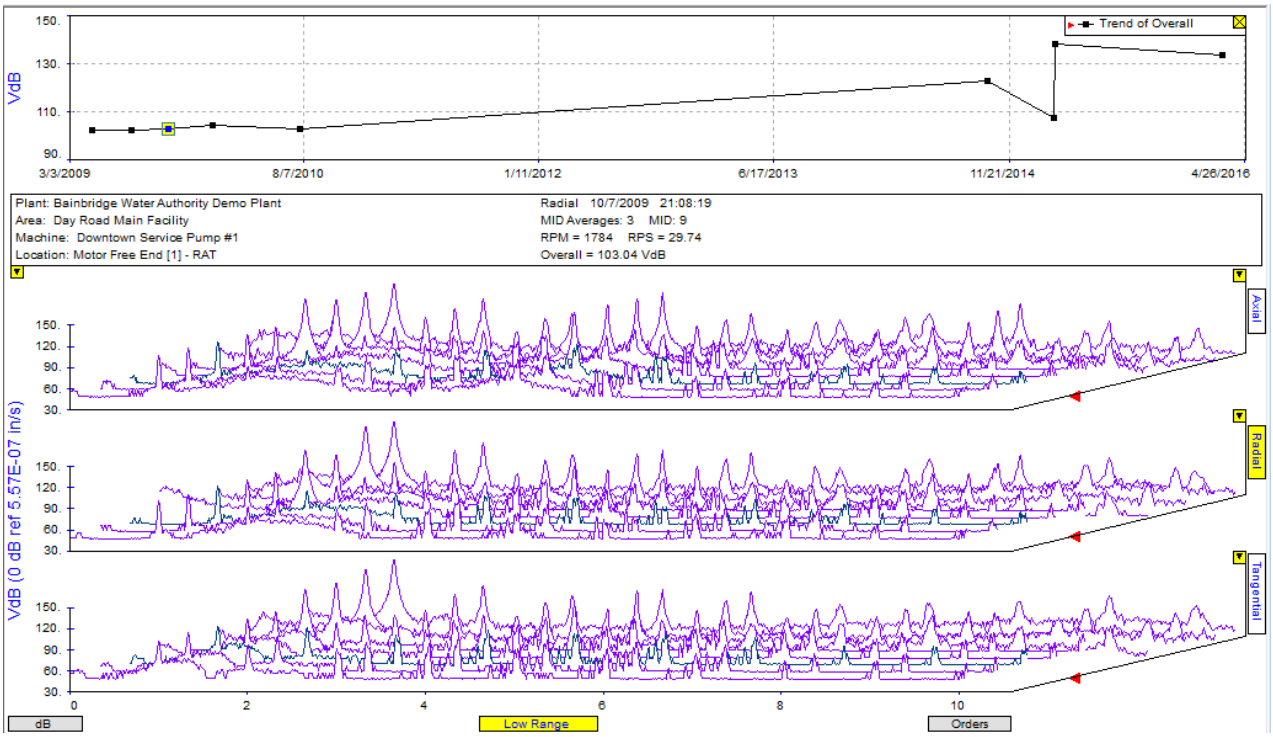
Triaxial Waveform Plot:



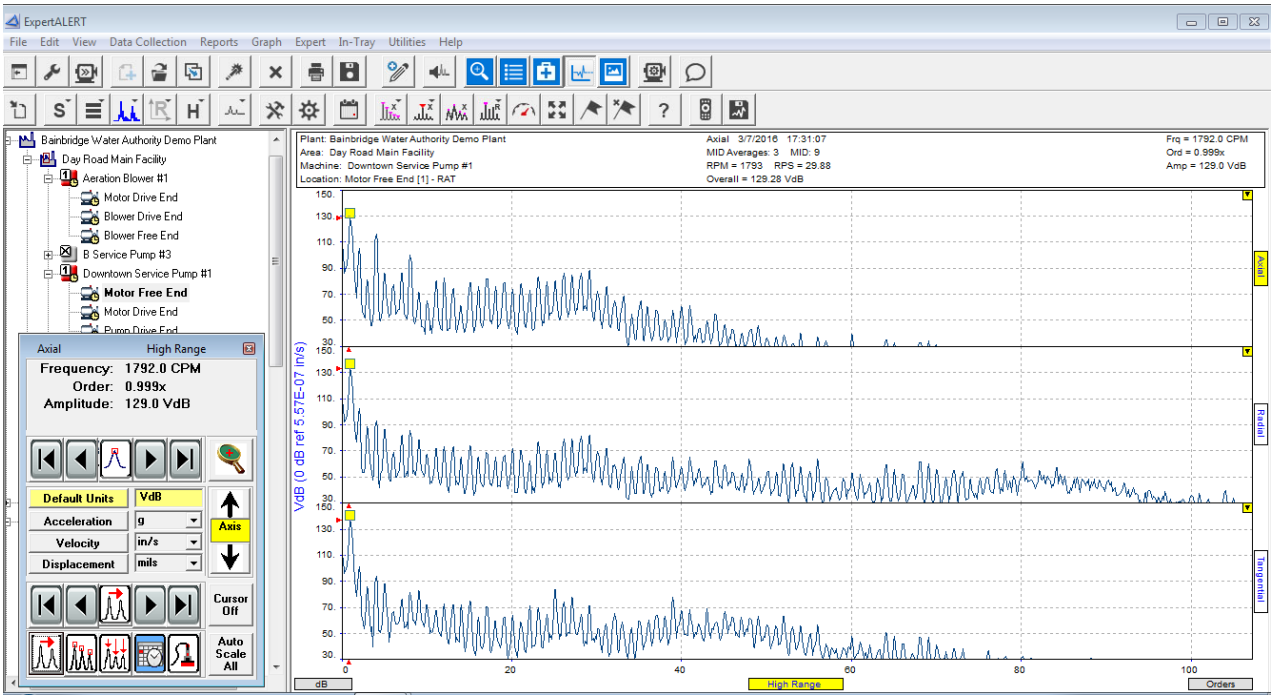
Autocorrelation Plot of Waveform Data Above:



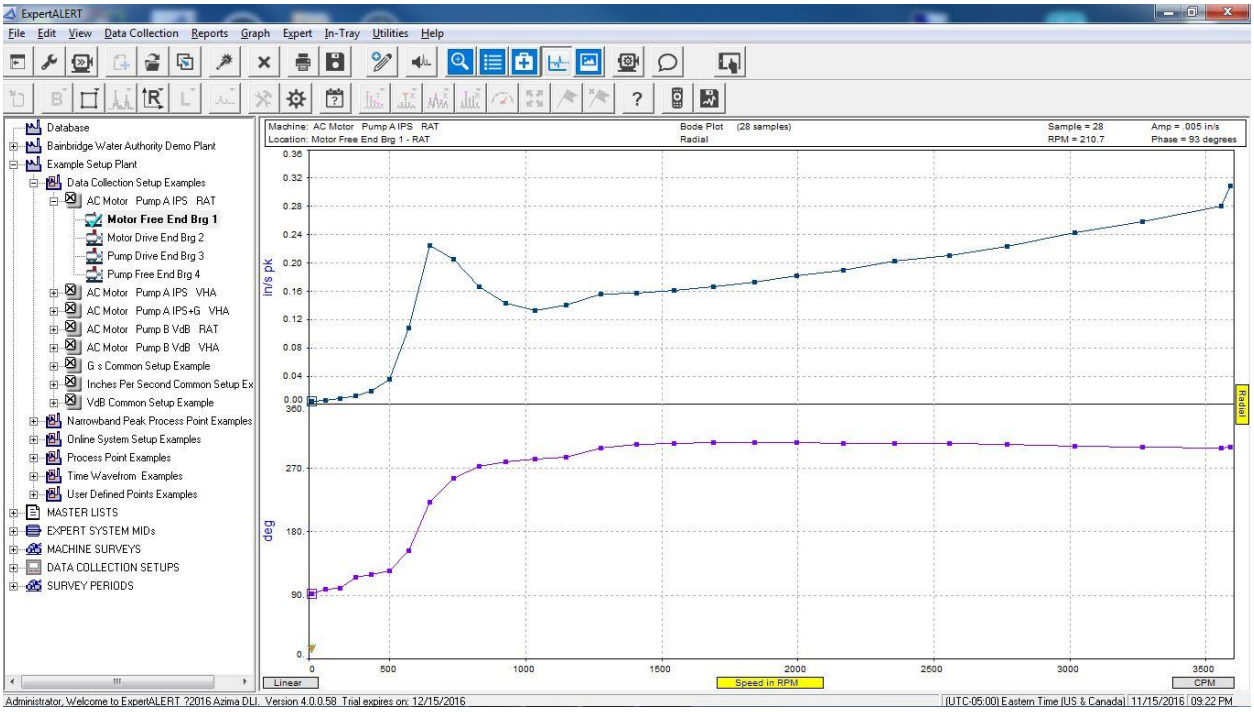
Spectral Waterfall with Overall Trend:



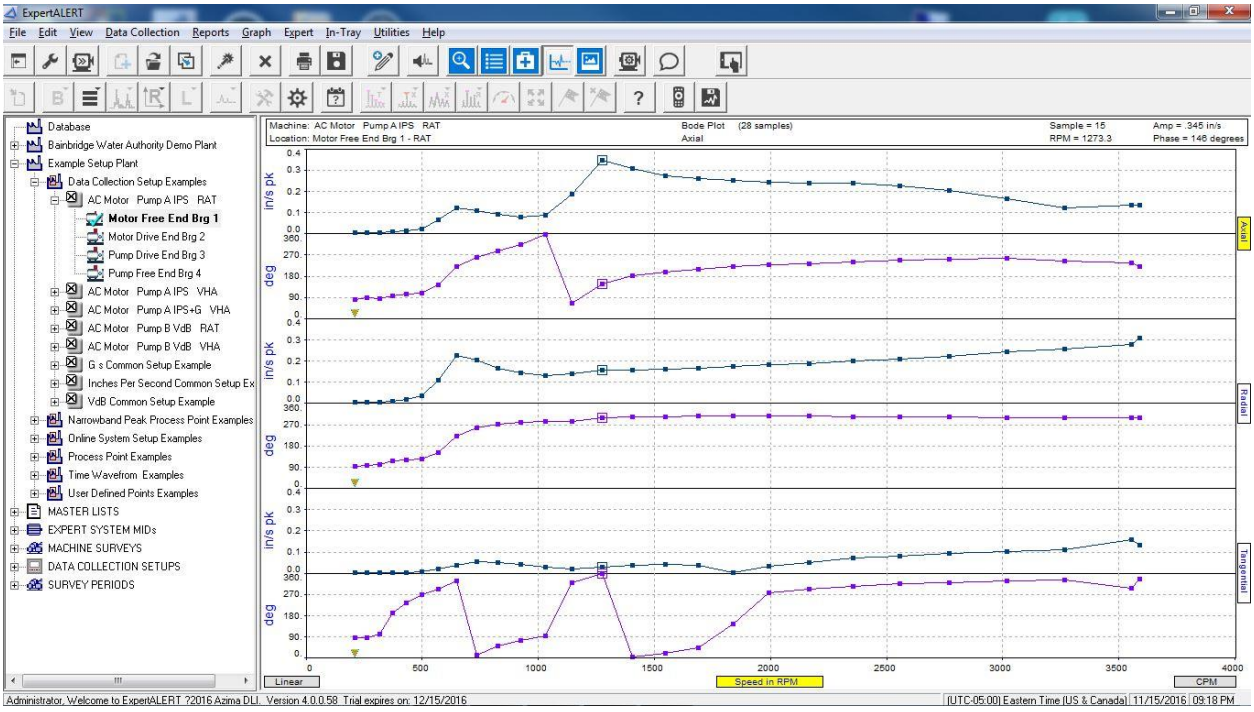
Triaxial Spectral Plot with Remote Control:



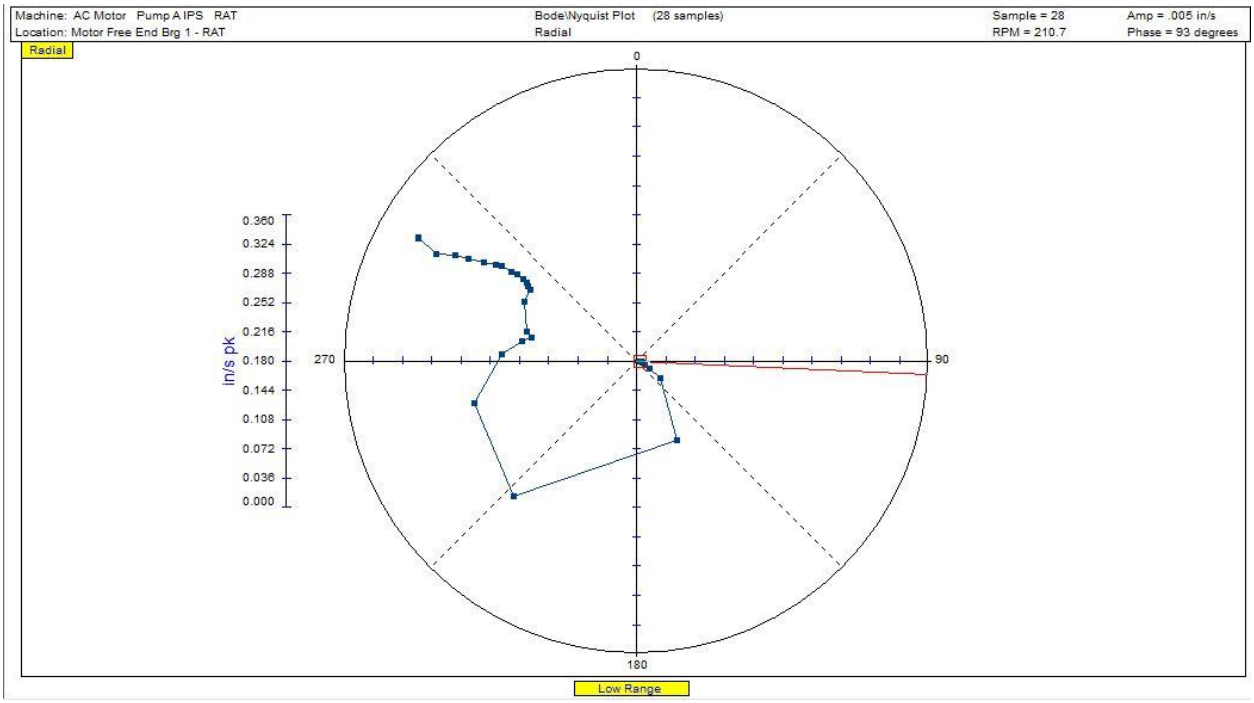
Bode Plot – Single Axis



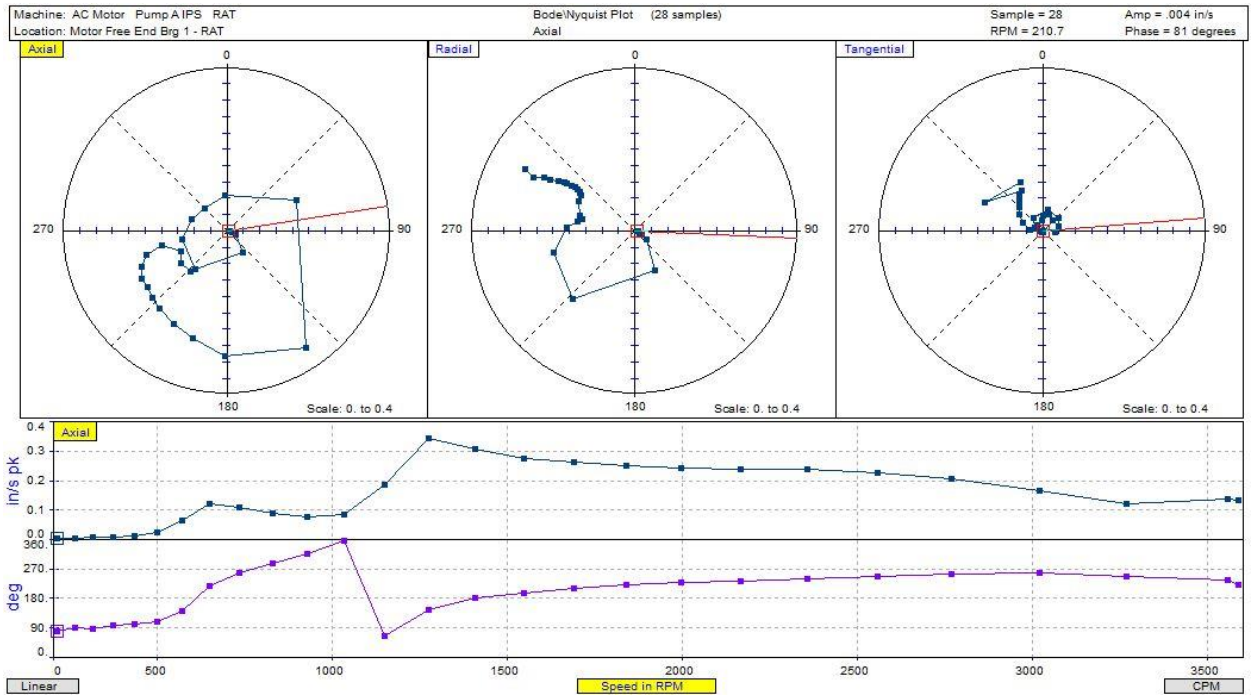
Bode Plot - Triaxial



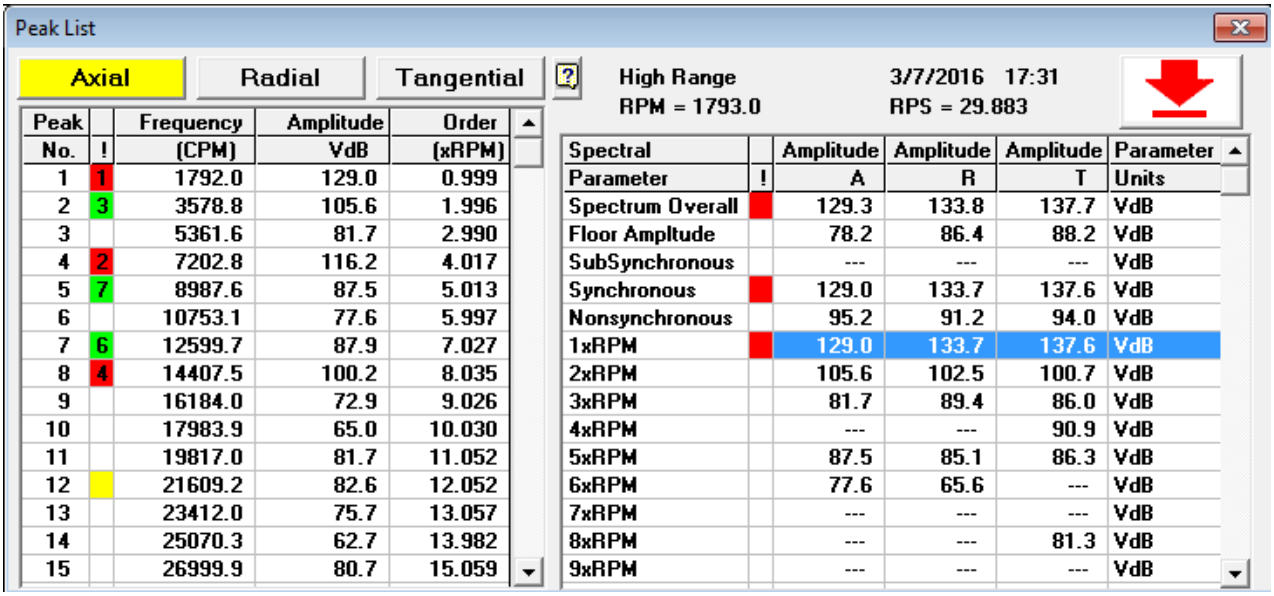
Nyquist Plot – Single Axis



Nyquist Plot - Triaxial



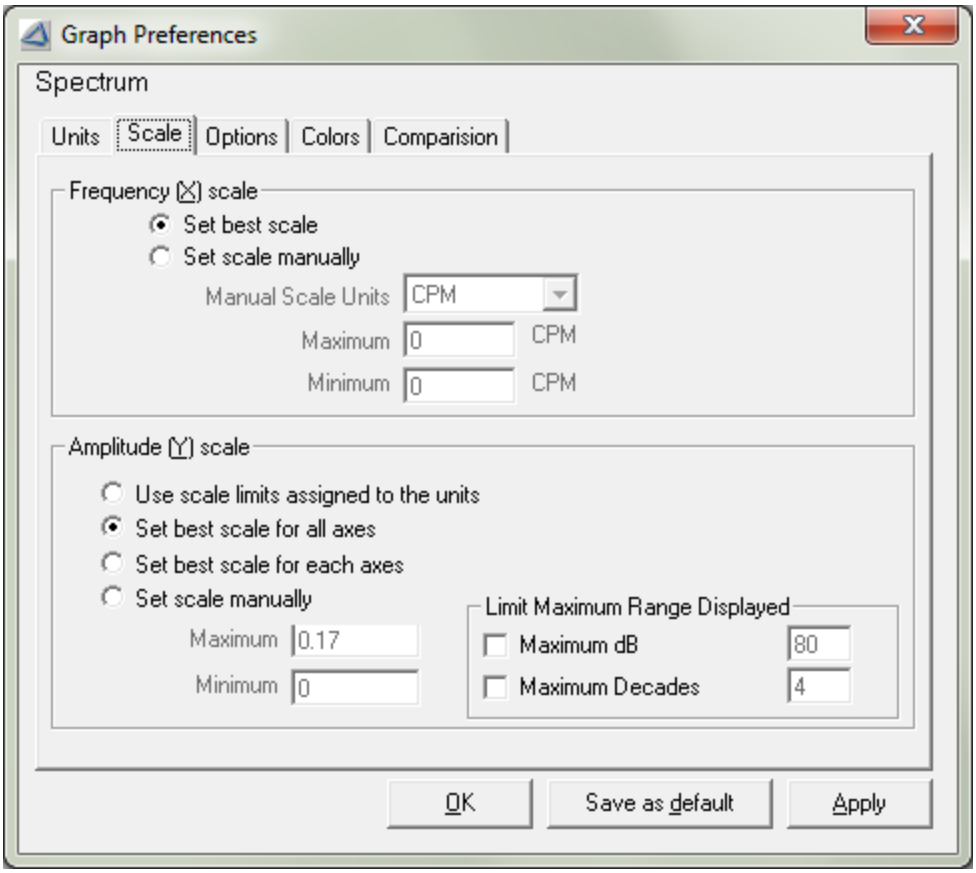
Peak and Parameter list from Spectral Data



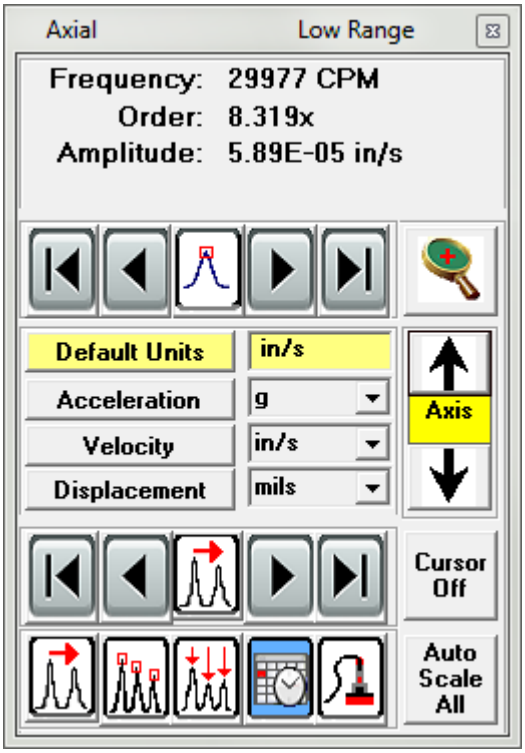
Peak No.	!	Frequency (CPM)	Amplitude VdB	Order (xRPM)
1	1	1792.0	129.0	0.999
2	3	3578.8	105.6	1.996
3		5361.6	81.7	2.990
4	2	7202.8	116.2	4.017
5	7	8987.6	87.5	5.013
6		10753.1	77.6	5.997
7	6	12599.7	87.9	7.027
8	4	14407.5	100.2	8.035
9		16184.0	72.9	9.026
10		17983.9	65.0	10.030
11		19817.0	81.7	11.052
12		21609.2	82.6	12.052
13		23412.0	75.7	13.057
14		25070.3	62.7	13.982
15		26999.9	80.7	15.059

Spectral Parameter	!	Amplitude A	Amplitude R	Amplitude T	Parameter Units
Spectrum Overall		129.3	133.8	137.7	VdB
Floor Amplitude		78.2	86.4	88.2	VdB
SubSynchronous		---	---	---	VdB
Synchronous		129.0	133.7	137.6	VdB
Nonsynchronous		95.2	91.2	94.0	VdB
1xRPM		129.0	133.7	137.6	VdB
2xRPM		105.6	102.5	100.7	VdB
3xRPM		81.7	89.4	86.0	VdB
4xRPM		---	---	90.9	VdB
5xRPM		87.5	85.1	86.3	VdB
6xRPM		77.6	65.6	---	VdB
7xRPM		---	---	---	VdB
8xRPM		---	---	81.3	VdB
9xRPM		---	---	---	VdB

The graph Preferences has some new functions in the Scale tab. This updated section better handles the display of data.



The remote control puts all common analytical tools in one location. This makes the analyst more efficient and minimizes mouse movements. This remote control logically locates the common analyst functions such as cursor control, peak locator, unit / scaling switching, harmonic and sideband family locators, location progression, test date progression, and alarm screening. For the power users who spend lots of time looking at data, there are all new hot-keys assigned for the most operations.



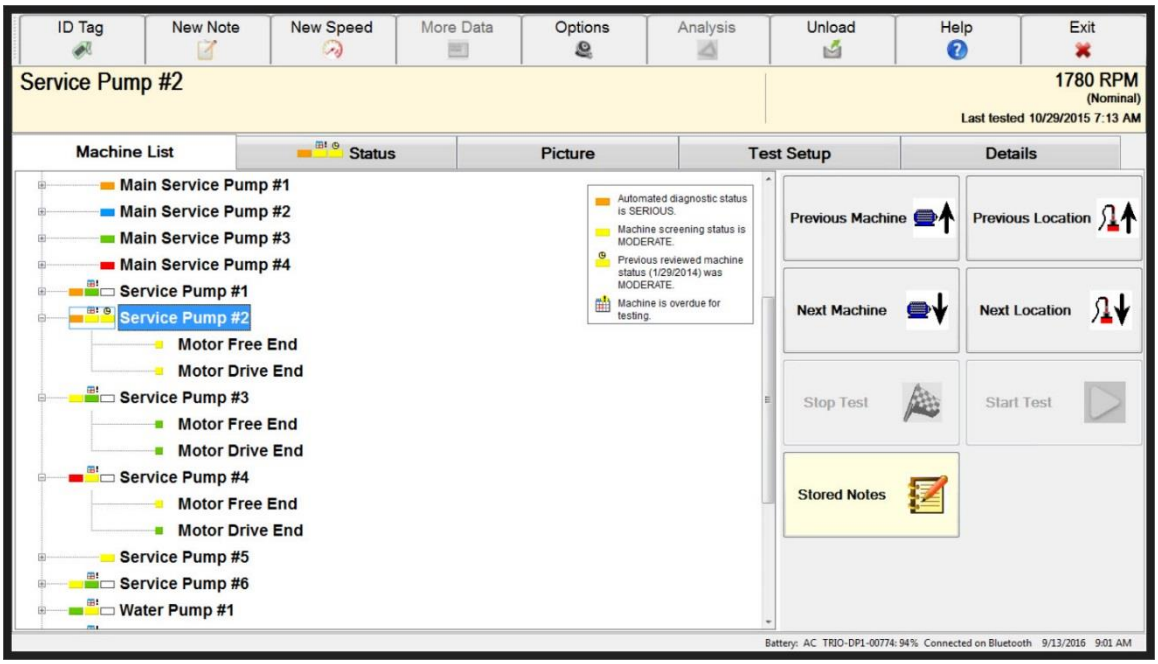
Micro-Cursor Movements
Peak Locate
Fast switching between units for spectra or waveform
Type of scaling control button
Remove all cursor control button
Axis movement function for single or triax formats
New peak list and peaks analysis functions
Alarm screening function for spectral peaks and parameters
New peak jump function on spectral and waveform graphs
New harmonic and sideband family locate and display functions
Move between locations
Move between test measurements
Move between fault frequencies
Revolution markers and single revolution selector
Improved movement between graphs on waterfall plots

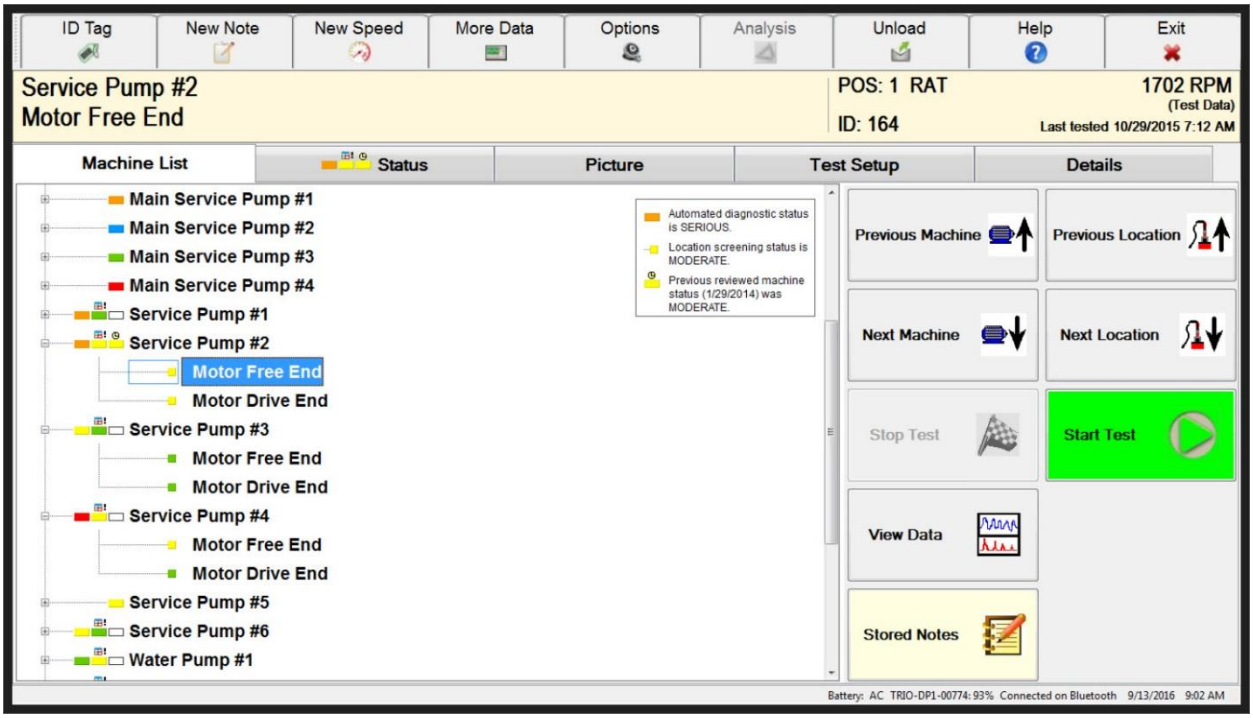
Finally, the data viewing window can now be resized to help paint the best analytical picture for determining the patterns to vibration. In a double triax view, the Low Range and the High Range can be repositioned to utilize the space.

Alt ◄►	Changes horizontal space assigned to Low and High Range for dual triax graphs
Home	Toggles the visibility of the slider arrows for dual triax graphs

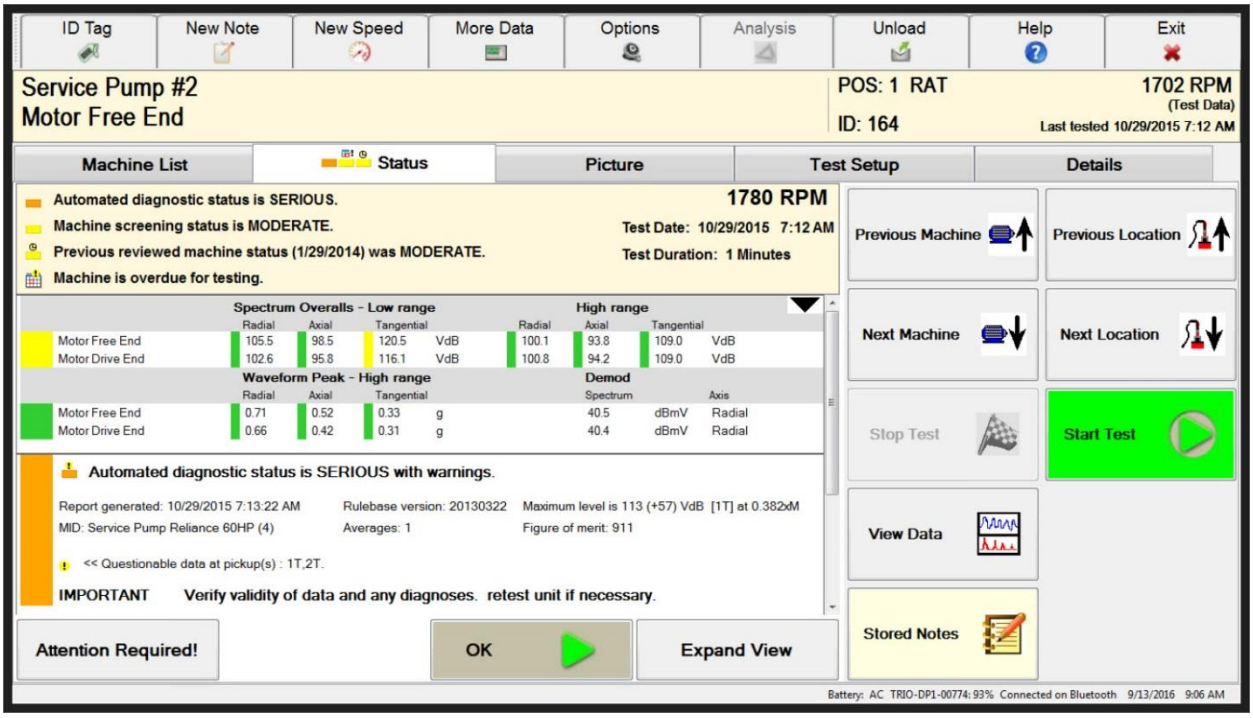
TRIO

All new status indicator flags for machines and locations give users a better visual for the existing fault states of a machine. Status flags indicators include independent visibility of automated diagnostic results from reviewed diagnostic results, as well as an all new machine and location screening algorithm to present a better pass/fail following machine collection.

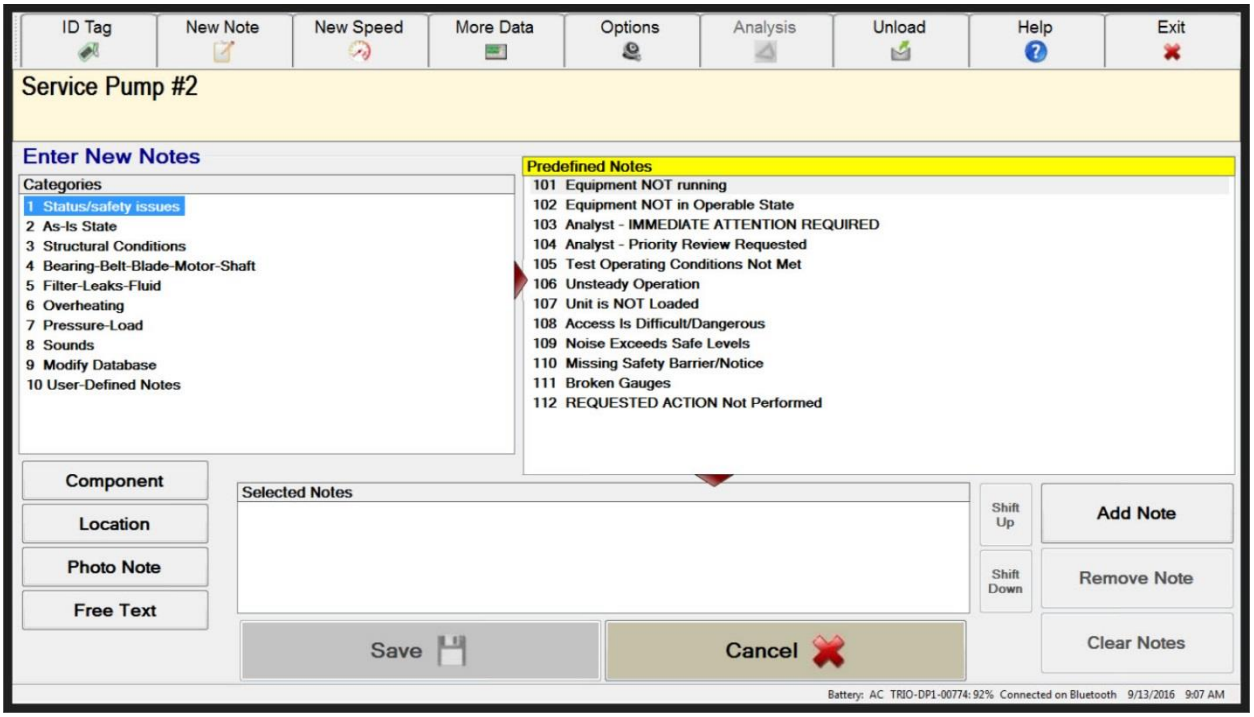


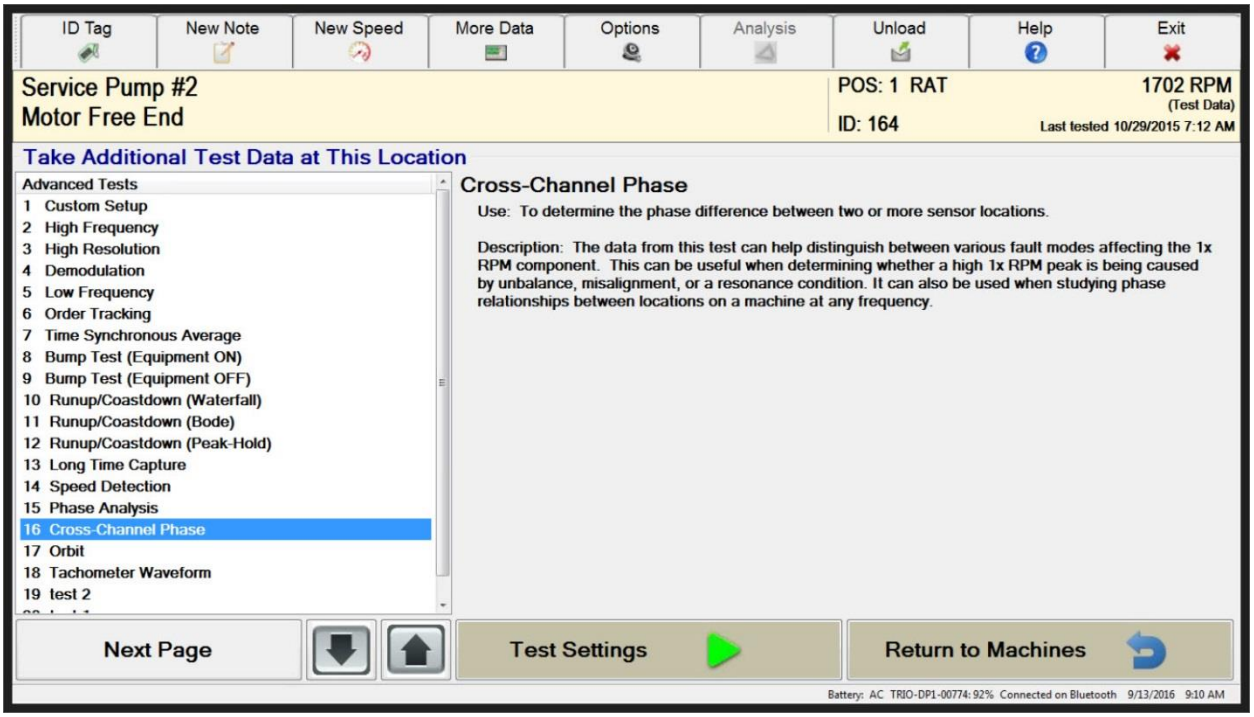


A new status tab presents a variety of data to the analyst in the field. Screening indication gives users better sense of pass or fail ahead of detailed diagnostics. The view can be expanded to show a mosaic of data plots to give a better picture of what is happening.

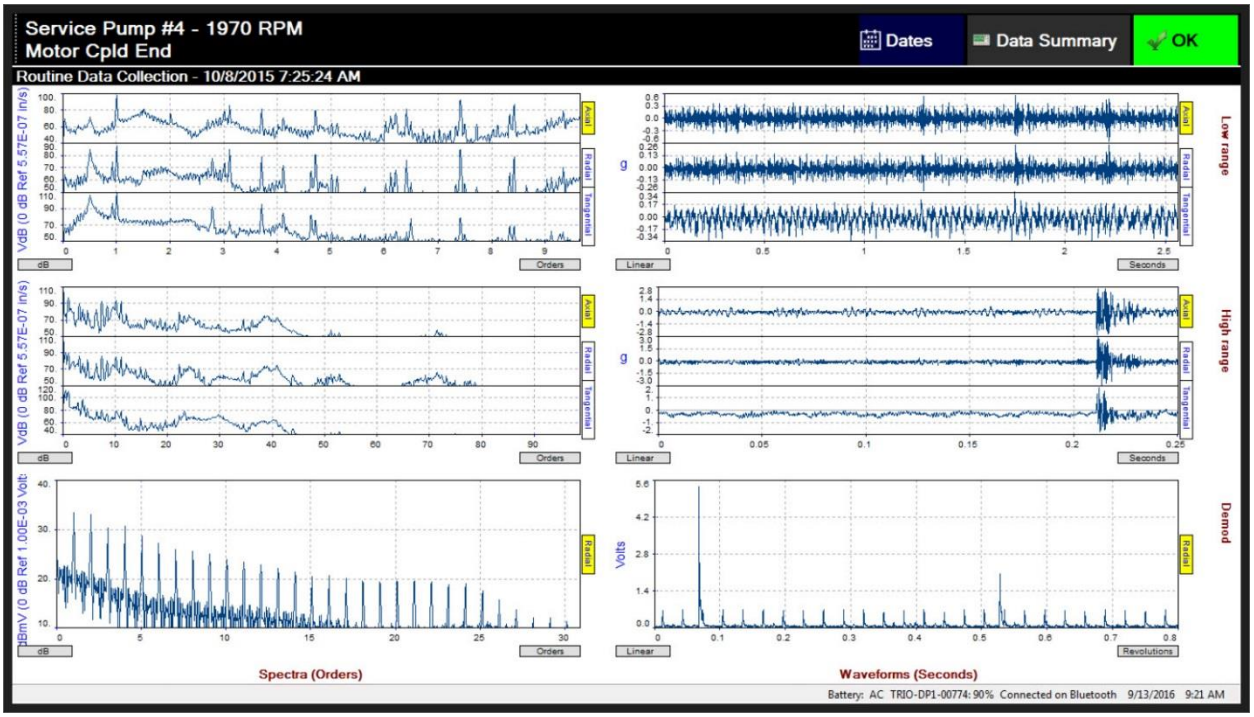


Simple communication between analyst and data collector is important in any program. ALERT 4.0 continues with Azima DLI's unmatched communication mechanisms. 4.0 includes an improved analyst notes section which increases the efficiency and consistency in relaying additional tests or steps for data collectors in the field.

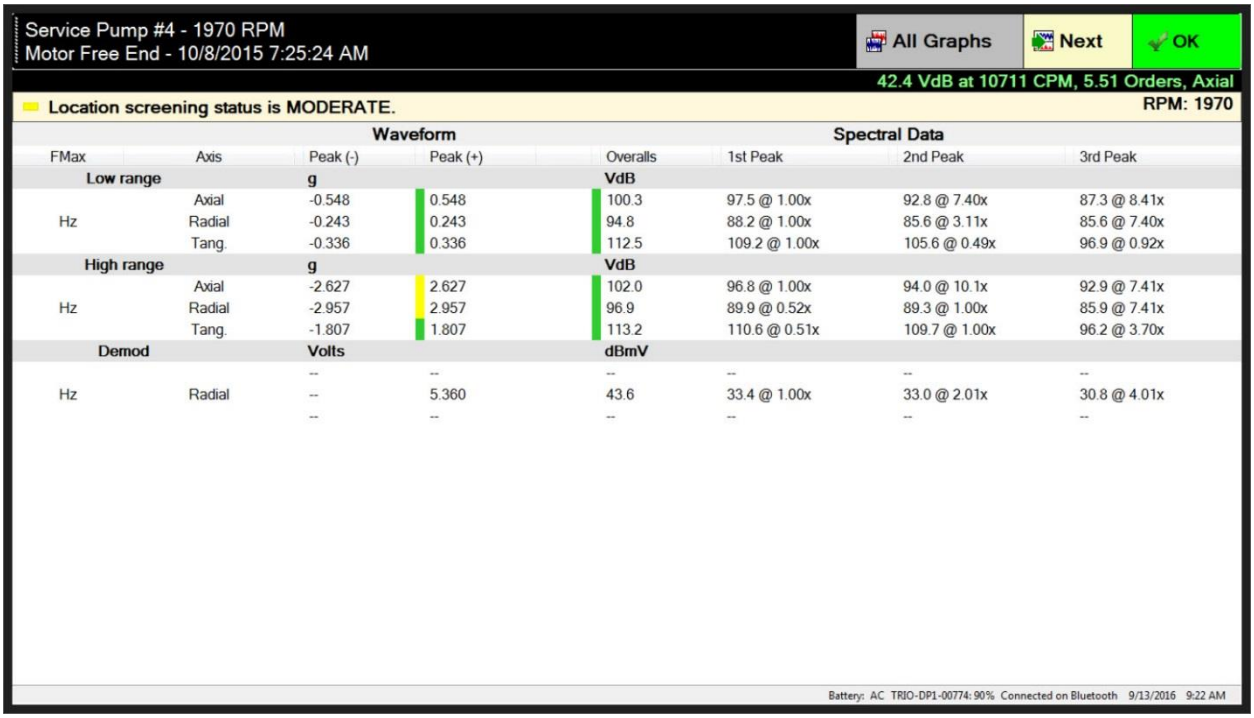




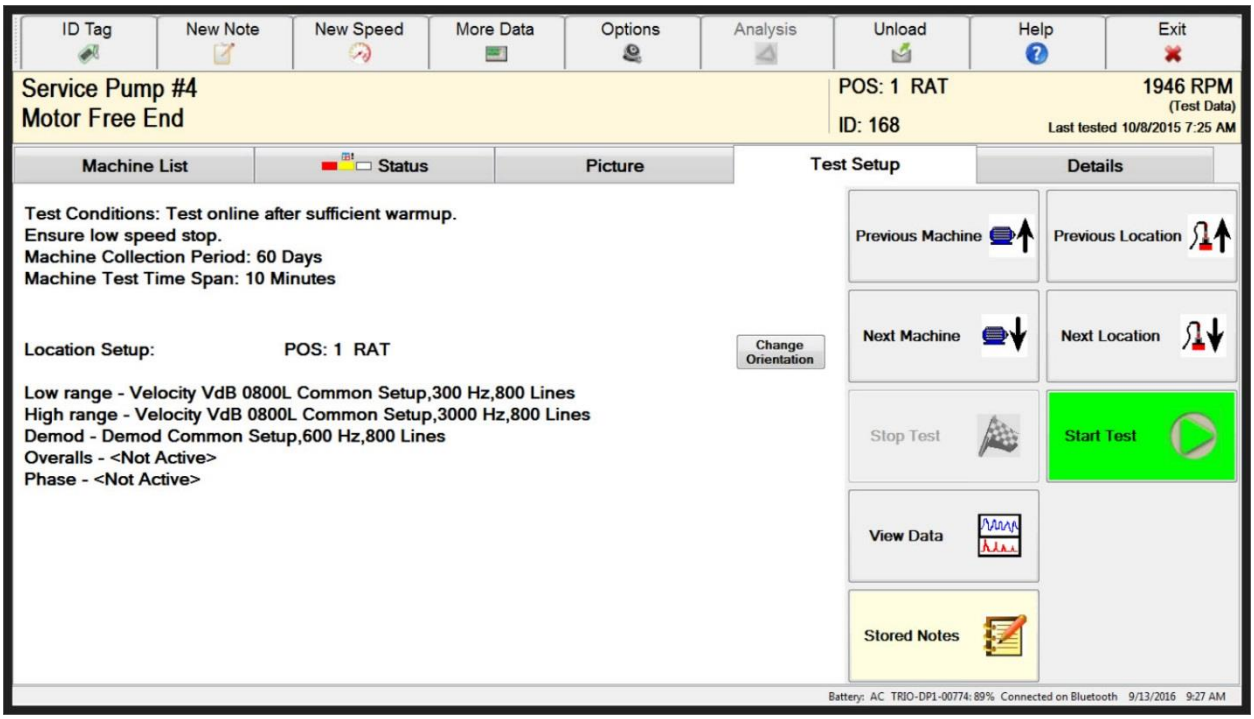
A greatly improved graphic viewer gives more information to users. This includes mosaic views, legends, and improved cursor controls.



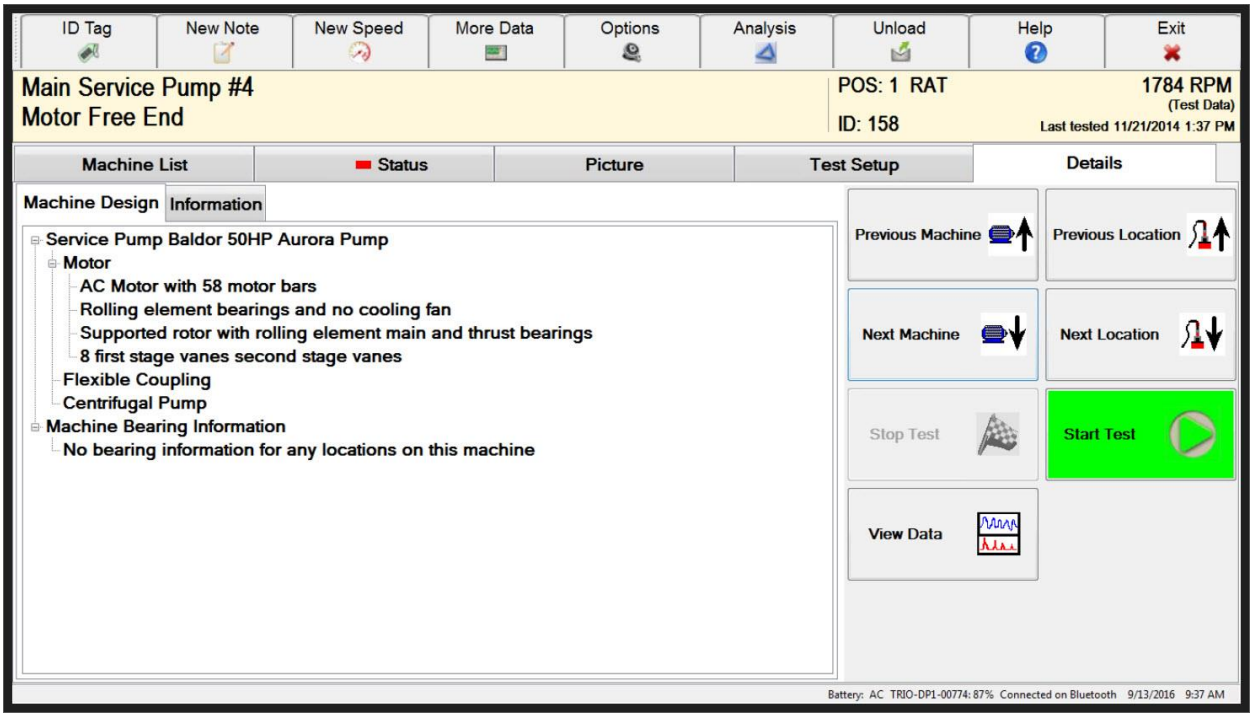
New amplitude alarm triggers from waveform data, spectral data, and overall values.



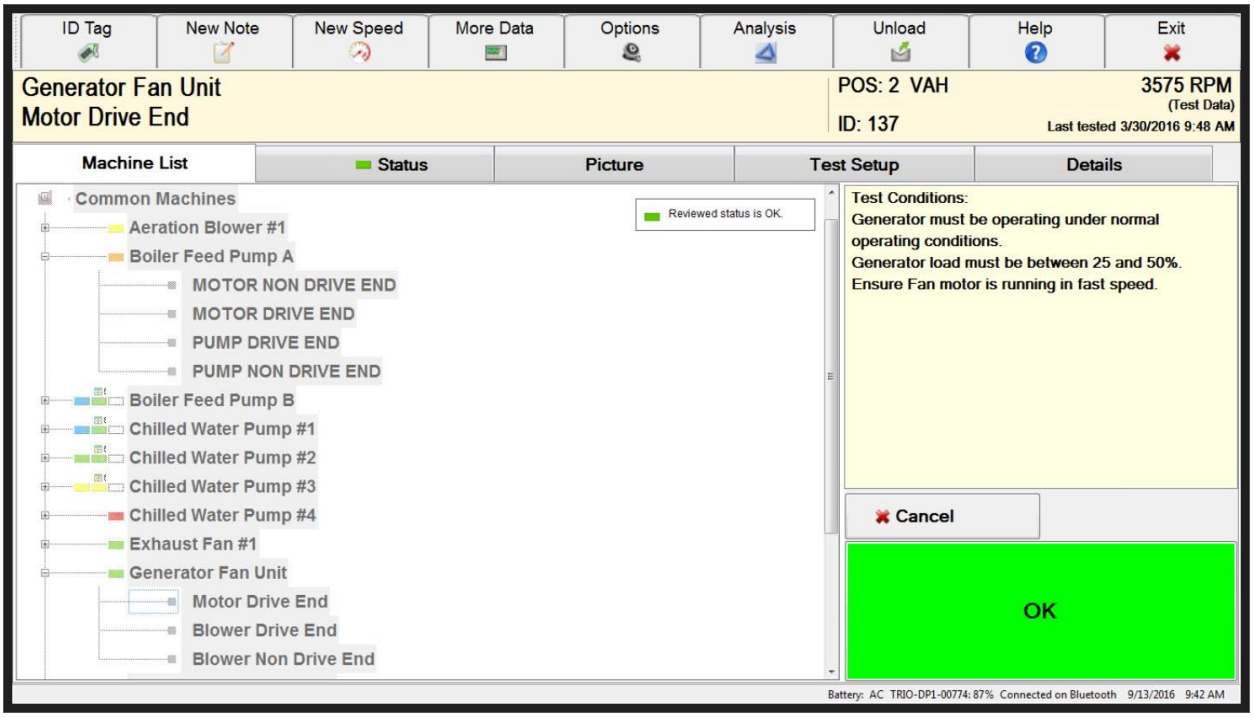
New to users is the ability to quickly change the orientation of the triaxial sensor while in the collector application. When collecting data, and the sensor is incorrectly positioned or needs to be relocated, the user can simply change the setting on the fly.



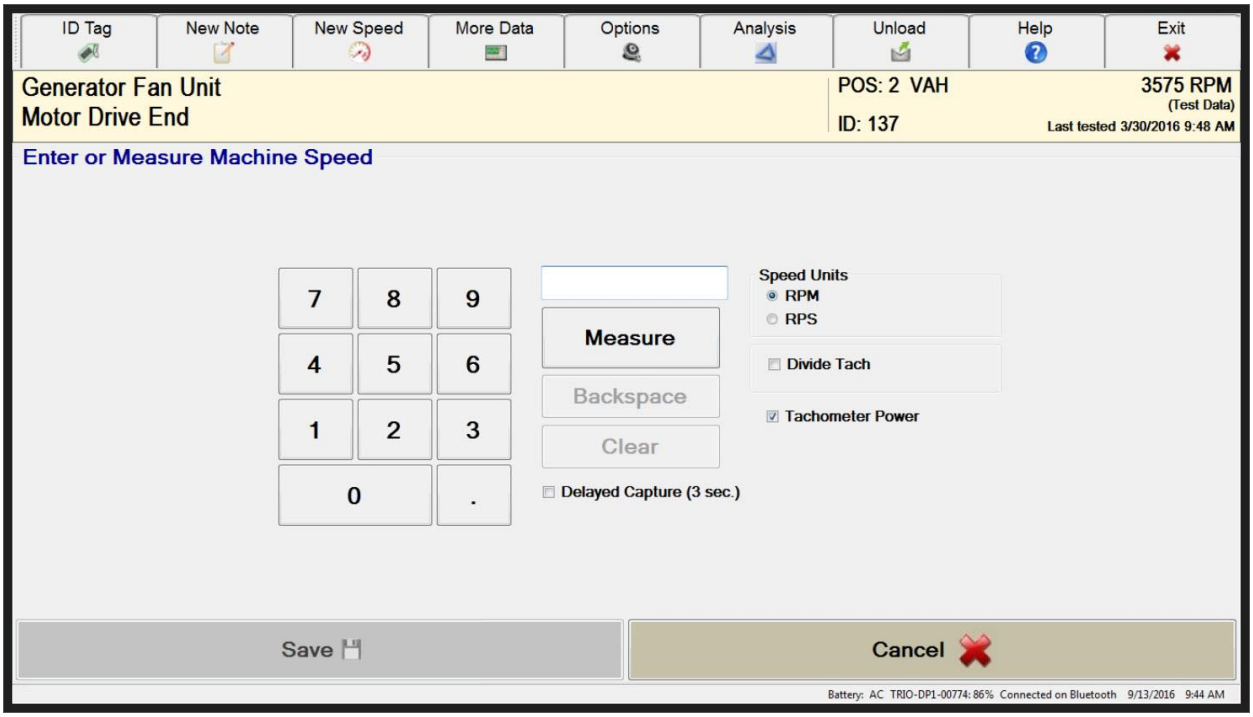
The details tab in Collector now presents the information that is stored in the details view of ExpertALERT as well as the machine design.



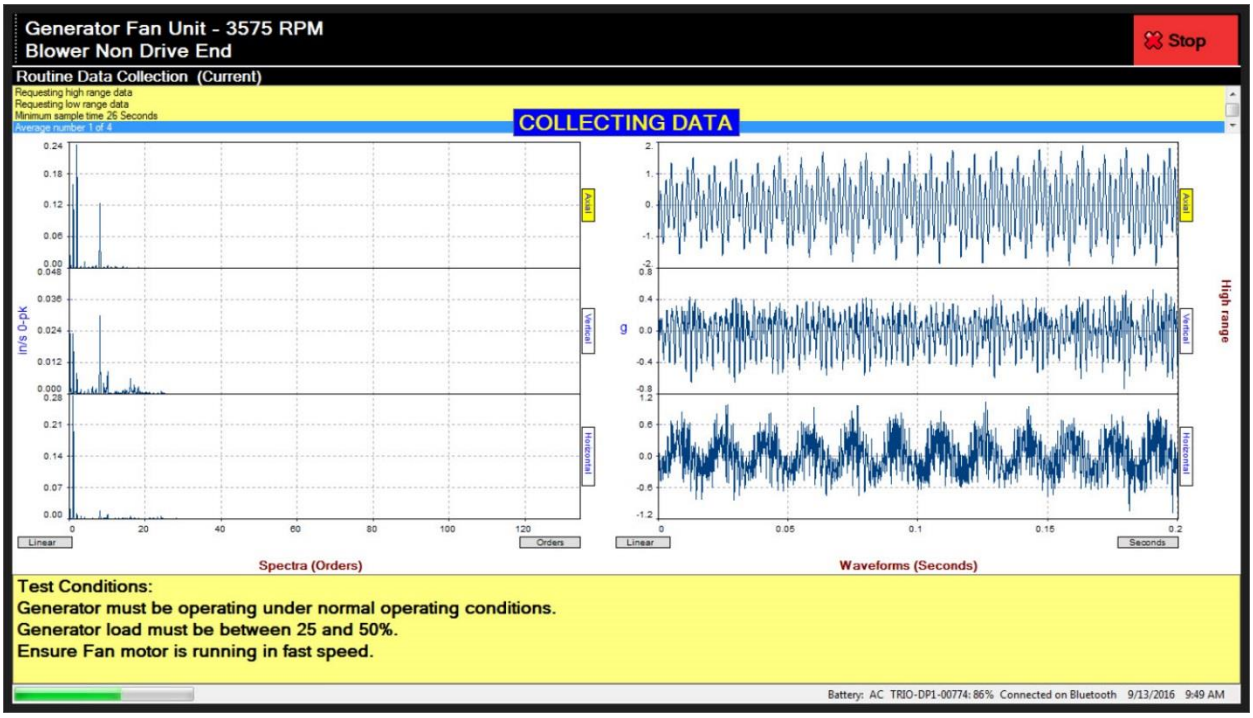
A change to the way collection occurs is the visibility of any test operating conditions which are specified for a machine. When the first location of a machine is selected for data collection, if any test conditions are defined, these will be displayed for acknowledgement before proceeding.



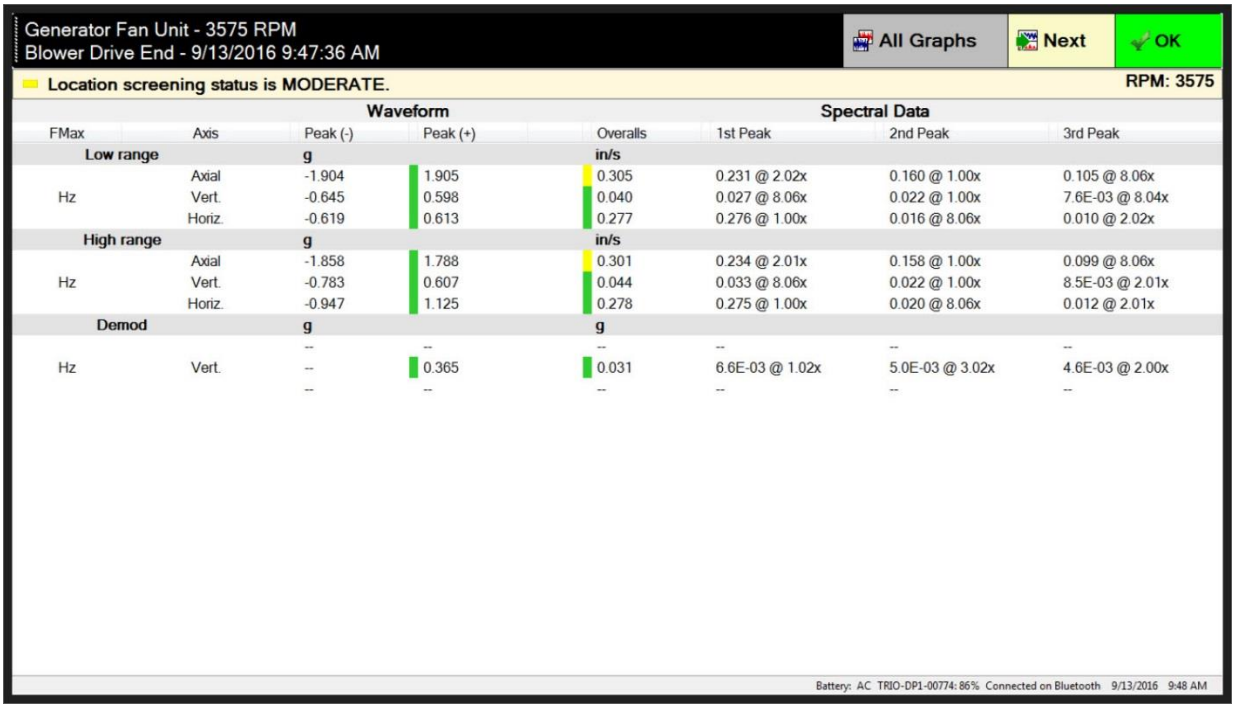
Collector 4.0 now allows a user to specify tachometer power requirement attached to the DP-2.



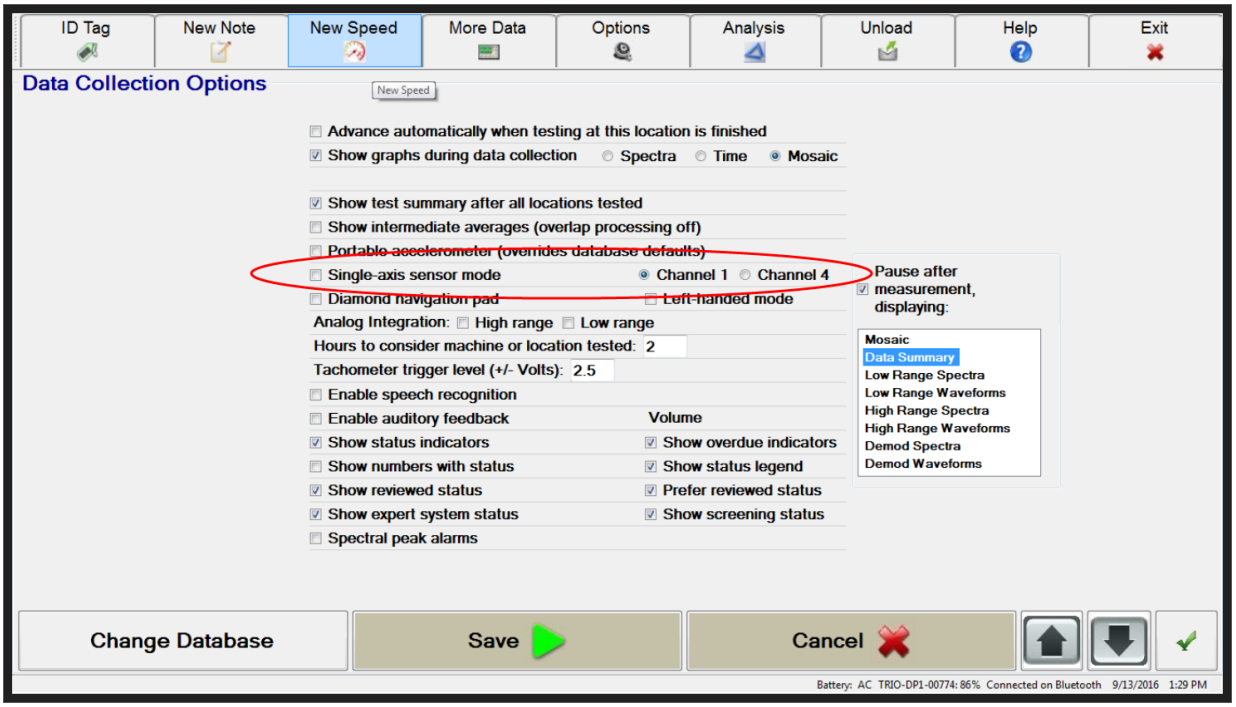
Collector 4.0 adds the ability to show a mosaic display during data collection so more information can be presented to the user in a logical fashion.



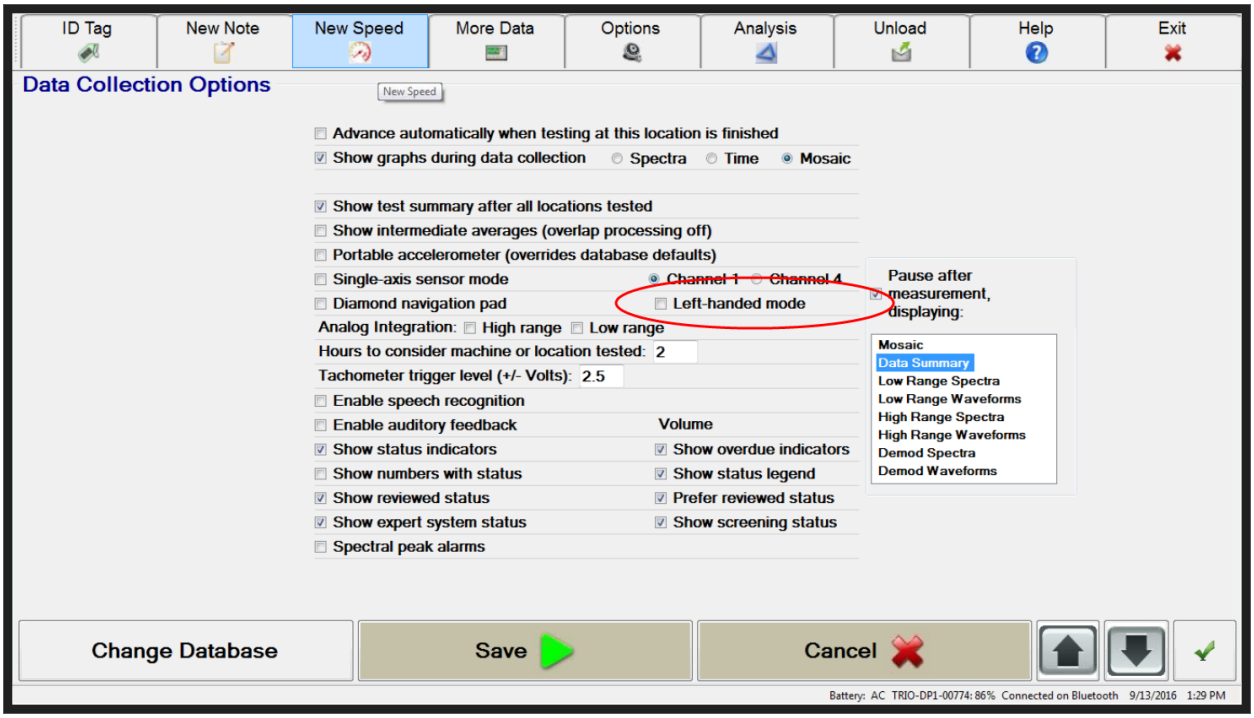
Using Azima DLI's proprietary algorithms, ALERT 4.0 will validate the data collected and screen it for potential problems ahead of full diagnostics through the Expert Automated Diagnostic System of ExpertALERT or manual analysis.

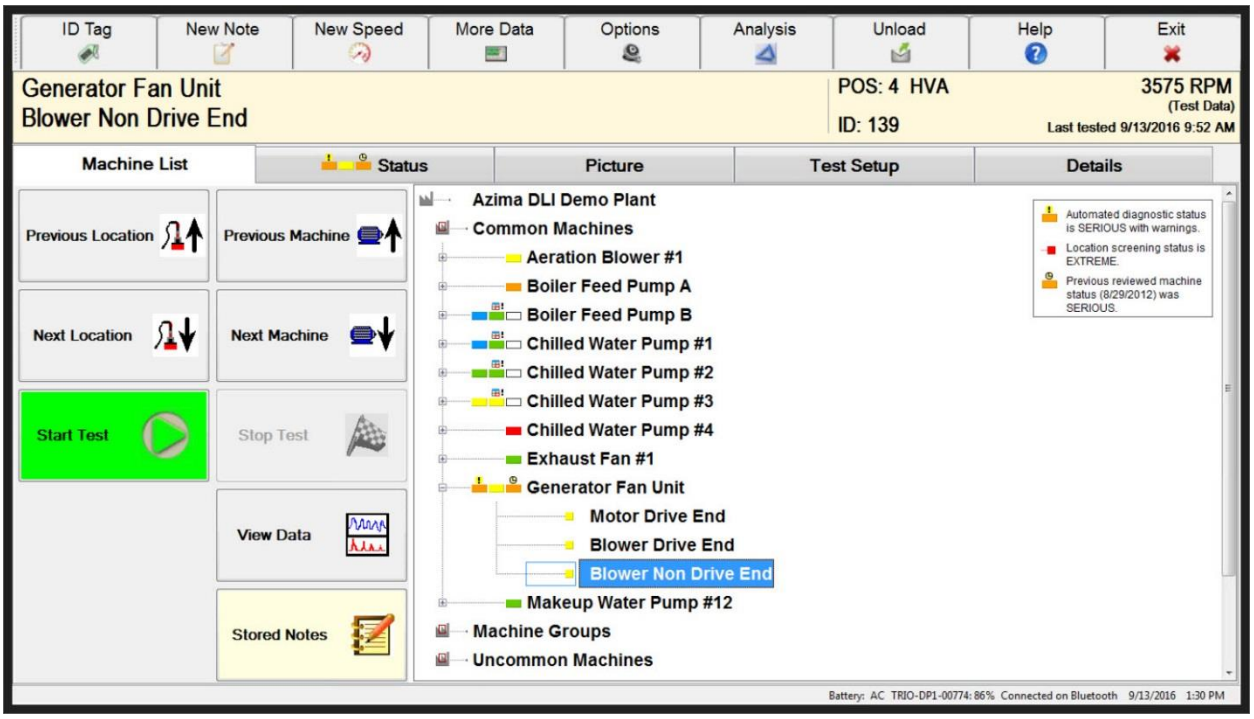


Now users can utilize channel 1 or channel 4 as part of single axis sensors. This saves time and wear and tear on the data collector by utilizing an adapter which puts both a triax and a single axis (portable or through a junction box) into the collector without needing to move cables.

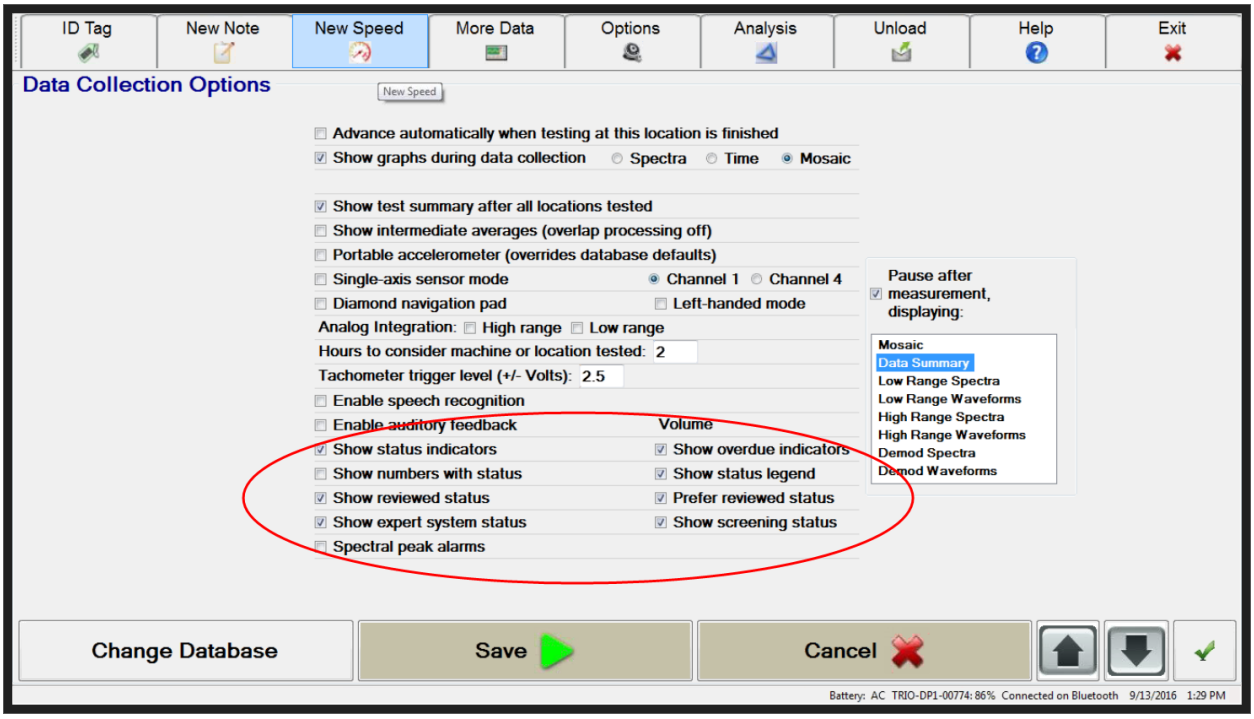


Collector 4.0 offers Left-handed mode of operation:

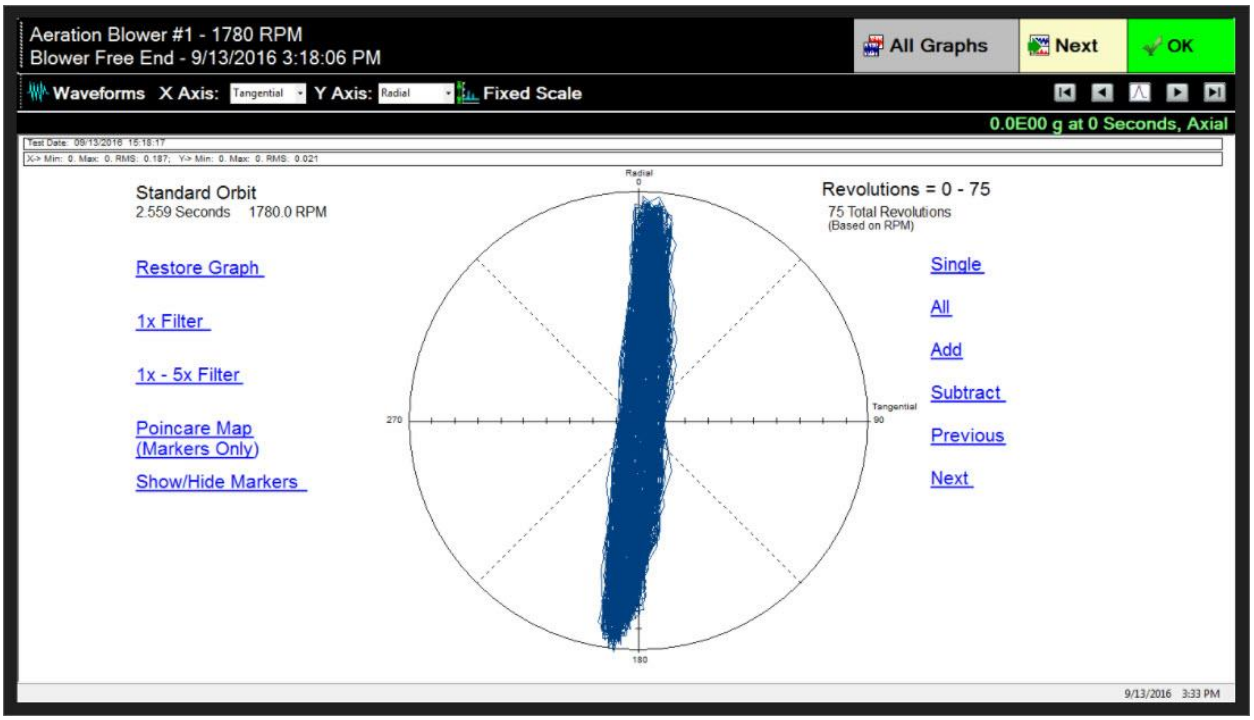




Not all features of ALERT 4.0 or Collector 4.0 are needed by all users. The user preference option allows for user to decide what information needs to be presented.



Finally, for advanced users, Collector-X allows for the display of orbits.



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