Get Control, Inc.
Embedded Solutions

InfoCenter Desktop Application

User's Guide

Version 4.0

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InfoCenter App – Desktop User's Manual

Starting with version 4.00, the InfoCenter Desktop App combines graphing options for On-Board Data Reduction and Time Domain Vib Tool recordings. Previous versions required the use of the VibPlot App for *Time Domain Graphs*.

The Vib Tool can record data in two formats – On-Board Data Reduction and Time Domain. On-Board Data Reduction data files contain a set of reduced data points. The time domain data used to calculate the Legacy RMS, Peak and True RMS data points is not retained. Graphing options for these data files are limited to the Legacy RMS, Peak and True RMS data points recorded.

Time Domain Mode data recordings include the raw time domain data. This data is reduced during the upload process, making the same reduced data points (*Legacy RMS*, *Peak* and *True RMS*) available for graphing. In this mode, the time domain data is also available for graphical analysis.

The InfoCenter Desktop App provides options to connect to a GCI Vib Tool, display a list of recorded data files residing in the Vib Tool's internal memory, and select individual files for upload or deletion. This allows the user to retrieve recorded vibration data from the Vib Tool.

Software Licensing

A thirty (30) day trial period is initiated when the InfoCenter Desktop App is installed. All software features are enabled during the trial period. *File* menu options (*Save Recorded Data* / *Open Data Set* / *Connect to Vib Tool* / *Export Data*) are disabled when the trial period ends unless a valid software license is installed. The software will load the last data file viewed, but all other input and output options will be disabled.

Trial period status is displayed at the top left of the main graph window and on the *About GCI InfoCenter Application* dialog box.

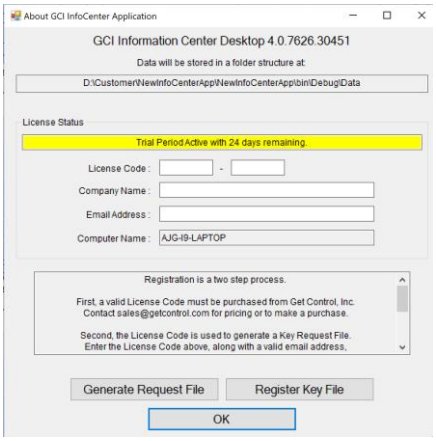

Figure 1 - Trial Period shown on About Dialog Box

Software licensing for the InfoCenter Desktop App is a two-step process. A License Code is used to create a Key Request File on the PC running the App. Get Control uses the License Code and Key Request File to generate a Key File that must be registered in the App software. Each PC running the App requires a unique Key File.

License Code

First, a License Code must be obtained from Get Control, Inc. (contact Get Control for pricing or to purchase a License Code - sales@getcontrol.com). License Codes can be purchased for a variable number of PC installations.

Once a License Code is received, it must be entered in the *About* dialog box License Code fields. The Company Name and Email Address fields must also be filled in. Once all required data is entered, the **Generate Request File** button can be used to create the Key Request File.

Key Request File

The Key Request File is generated using the entered License Code, Company and Email Address, along with a unique hardware identifier from the PC hard drive. The combination of these data fields creates a unique hash value that is stored within the Key Request File.

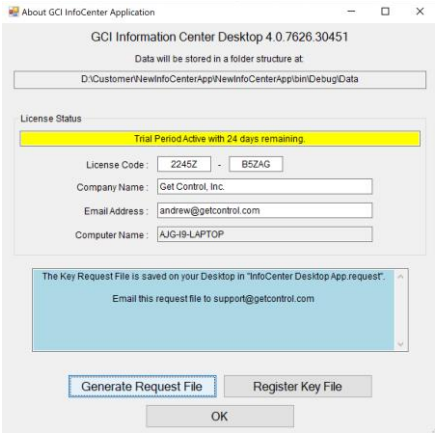

Figure 2 - Request File Generated

The file is stored on the user's Desktop using a filename of the form:

"InfoCenter Desktop App.request"

This file must be emailed to support@getcontrol.com. Its contents should not be modified.

Key File

Get Control uses the details in the Key Request File to generate a unique Key File for the requesting PC. The Key File cannot be used for a different PC. It is only compatible with the PC used to generate the Key Request File.

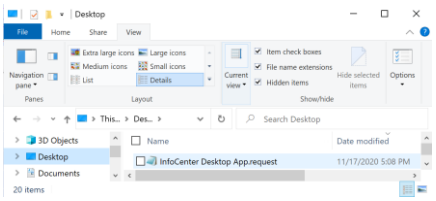

Figure 3 - Key Request File on Desktop

The Key File will have a filename of the form:

"InfoCenter Desktop App_XXXXX-YYYYY_PC-Name.key"

Get Control will reply to the Key Request email with the new Key File. The user should copy the Key File onto the requesting PC and launch the InfoCenter Desktop App. Display the *About* dialog box and use the **Register Key File** button. A standard *File Open* dialog box is displayed. Use it to locate the Key File and open it.

If the selected Key File is valid for the PC, the *About* dialog box will be updated to show that the software is now licensed.

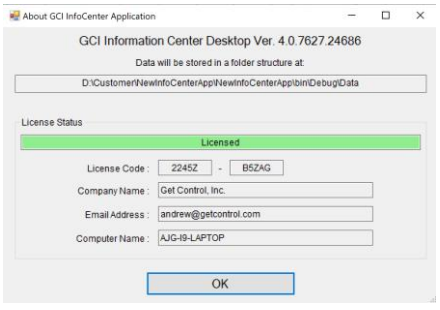

Figure 4 - Licensed Software

GUI

When the App is started, the *Reduced Data Graph Window* is displayed (Figure 31), showing data from the last data file viewed. The Vib Tool records vibration data on the X, Y, and Z Axes. Each graph described below contains an X and Y Axes. To limit confusion, this document will include the term 'vibration data' when referencing the X and Y axis vibration data. When referring to the graph axes, the terms X-Axis / Y-Axis will be used.

When viewing the *Reduced Data Graph Window*, a standard Windows *Menu* bar is shown. This section describes the options available through this *Menu* bar. Following sections detail each *Graph Window*.

Location Tags

The Vib Tool can be equipped with a radio that allows it to record fab location information supplied by AMHS vehicles that are configured with the GCI AMHS Radio. The AMHS radio receives location information from the AMHS vehicle through a serial port. It then transmits the location information wirelessly to the Vib Radio connected to the Vib Tool. Contact GCI for additional information about VibCom location recording.

When a data file has been recorded with an attached Vib Radio, location information is displayed along with vibration data in the *Reduced Data Graphs*. If the data set is from a Time Domain Mode recording, location tags are also displayed in *Time Domain Graphs*.

Location tags are shown by a vertical line, with the location tag information displayed near the top of the graph.

Location Tag Hotspots

Mouse hotspots are defined for each displayed Location Tag. When the mouse is placed at one of the Location Tags, a small Tool Tip style window is displayed showing details about the selected Location Tag. Details include the vibration data values from the given graph type.

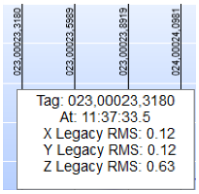

Figure 6 - Tag Hotspot

Tools Ribbon

A *Tools Ribbon* is displayed at the left side of each *Graph Window*. The *Tools Ribbon* provides option buttons that can be used to close the current window, save the current window in a variety of graphics file formats, adjust the zoom settings for each graph axis, and enable / disable display of additional information.

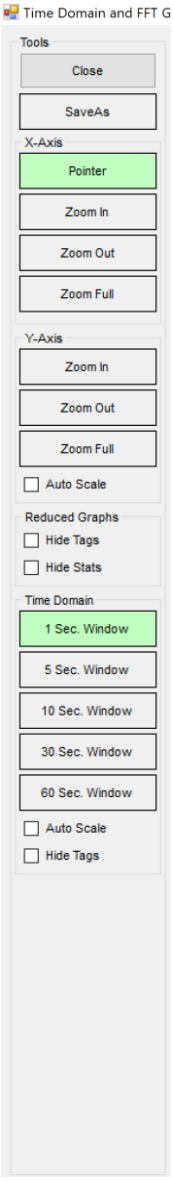

Figure 5 - Tools Ribbon

The *Tools Ribbon* is split into a minimum of four sections. The top of the *Tools Ribbon* holds option buttons that close and save the current window. A section specific to the X-Axis is shown immediately below the **SaveAs** button. This is followed by a section specific to the Y-Axis. A section specific to *Reduced Graphs* follows the Y-Axis section. On *Time Domain Graph Windows*, an additional section is provided specific to the graphs displayed.

The top four sections are the same for all windows and are described here. In each *Graph Window*, these options affect the *Reduced Data Graphs* on that window. Additional tools sections added for *Time Domain Graph Windows* are describe along with the specific *Graph Window* below and affect only those graphs.

Close

The **Close** option button closes the current *Graph Window*. This closes the application if the current window is the main *Reduced Data Graphs*. This is the only window available for On-Board Reduction Mode data files. When working with Time Domain Mode data files, additional graphing windows are available.

When viewing one of the *Time Domain Graph Windows*, the **Close** button closes the current window and redisplays the main *Reduced Data Graph Window*.

SaveAs

The **SaveAs** button can be used to save the currently displayed *Graph Window* to a variety of graphics file formats. The current *Graph Window* is saved in its current format, including zoom level and cursor position. When pressed, the user is presented with a standard *Save-As* dialog box.

The filename is defaulted based on the current data file name. Use the Save as type drop down menu to select the desired graphics file format.

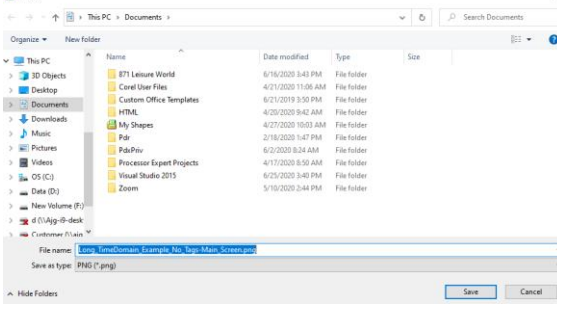

Figure 7 - Save As Dialog Box

X-Axis

The next section targets the *X-Axis*. This section provides zoom options that affect only the X-Axis. The currently selected option button is displayed with a light green background.

Pointer

All *Graph Windows* include *Reduced Data Graphs*. The **Screen Cursor** can be moved within the *Reduced Data Graphs* to pinpoint data values. When selected, the **Pointer** button sets the mouse icon to a pointer icon. When in this mode, left mouse clicks within a *Reduced Data Graph* will position the **Screen Cursor**.

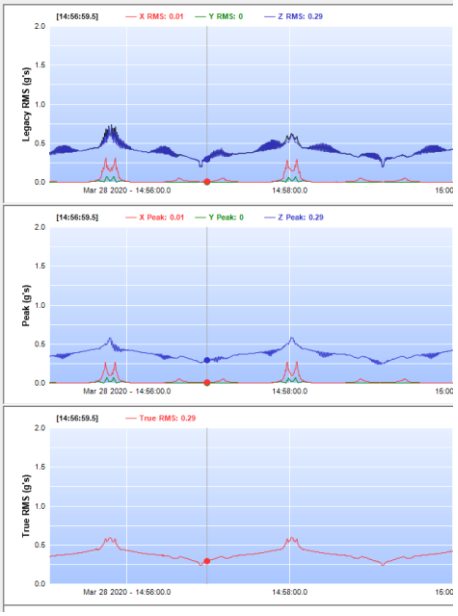

*Figure 8 - **Screen Cursor***

The **Screen Cursor** is displayed as a vertical line at the selected position within the *Reduced Data Graphs*. The intersection of this line with the data points for each axis is highlighted with a circle (in the axis line color). At the top of each *Reduced Data Graph*, the value of each axis data point is displayed, along with the timestamp of the associated data record.

The **Screen Cursor** can be moved by clicking with the mouse, or by using one of a set of keyboard keys. The Left / Right arrow keys will move the cursor one record to the left / right. The Home / End keys will move the cursor to the first / last record in the data set. The Page-Up / Page-Down keys will move the cursor 20% of the way up / down the data set.

Zoom In

The **Zoom In** button changes the mouse icon to a magnifying glass icon with a plus sign (+). When in this mode, left mouse clicks within a *Reduced Data Graph* will zoom the X-Axis at the selected position. Additional mouse clicks will zoom the X-Axis further into the data set. When the X-Axis zoom level is at its maximum value, the mouse icon changes to an empty magnifying glass.

Figure 9 - Zoom In X-Axis

Additionally, when the mouse icon is in this mode, clicking a dragging within a *Reduced Data Graph* will display a rectangle. When the mouse button is released, the X-Axis is zoomed to the level defined by the bounding rectangle.

Zoom Out

The **Zoom Out** button changes the mouse icon to a magnifying glass icon with a negative sign (-). When in this mode, left mouse clicks within a *Reduced Data Graph* will zoom the X-Axis out at the selected position. Additional mouse clicks will zoom the X-Axis further out until the full data set is shown, at which point the mouse icon changes to an empty magnifying glass.

Zoom Full

The **Zoom Full** button returns the X-Axis to its default setting, showing the full data set. After the X-Axis has been returned to its full setting, the Pointer option button is reselected.

Y-Axis

The third section in the *Tools Ribbon* targets the Y-Axis. This section provides zoom options that affect the Y-Axis. These buttons behave differently than the X-Axis buttons. Instead of changing the mouse cursor, and requiring a mouse click inside a *Reduced Data Graph*, each button click will activate that option.

Zoom In

The **Zoom In** button will decrease the maximum Y-Axis value by 0.1 Gs. Each time the **Zoom In** button is clicked, the Y-Axis maximum decreases another 0.1 Gs. The Y-Axis has a minimum limit of 0.1 Gs. When the Y-Axis reaches this level, the **Zoom In** button no longer functions.

Figure 10 - Y-Axis Zoom In

Zoom Out

The **Zoom Out** button will increase the maximum Y-Axis value by 0.1 Gs. Each time the **Zoom Out** button is clicked, the Y-Axis maximum increases another 0.1 Gs. The Y-Axis does not have a maximum limit, though the default maximum is 2.0 Gs.

Zoom Full

The **Zoom Full** button resets the Y-Axis to its default value of 2.0 Gs.

Auto Scale

The **Auto Scale** option is a check box. When this box is clear (no check mark), the Y-Axis Zoom buttons are functional. When this box is checked (with a check mark) the Y-Axis Zoom buttons are disabled and the Y-Axis maximum value is set based on the currently displayed data set.

When checked, the Y-Axis maximum will be change with the displayed data. As the X-Axis zoom is changed, the Y-Axis maximum may change. Un-check this box to return the Y-Axis zoom level to manual control.

Reduced Graphs

The third section in the *Tools Ribbon* targets the *Reduced Data Graphs*. This section contains two check box options that limit the display of certain information on the *Reduced Data Graphs*.

Hide Tags

The **Hide Tags** option removes location tags from *Reduced Data Graphs*. When this option is unchecked, any location tags found in the data file are displayed on the *Reduced Data Graphs* based on the current Warning and Error Limits defined in the *Configuration / Set Vib Limits* dialog box. These limits define which location tags are displayed, and how they are represented in the *Reduced Data Graphs*.

There may be times when the user wishes to view vibration data without the distraction of location tags filling up the graphs. The Warning and Error Limits can be used to remove all location tags from the *Reduced Data Graphs* by setting them both to very high values. Alternately, the **Hide Tags** option can be used to remove location tags from the graphs. When checked, all location tags are hidden.

Hide Stats

User defined Statistic Limits are available in the *Configuration / Set Statistic Limits* menu option (described below). The InfoCenter Desktop App uses these limits to calculate statistics for each reduction type. The percentage of data values for each reduction type that fall below the defined Statistics Limits are displayed on each *Graph Window*. See the section on **Configuration Menu - Set Statistic Limits** for details on statistics display.

When this option is unchecked, the current Statistics are displayed on each *Reduced Data Graph*. When checked, Statistics details are removed.

Inc. Fonts / Dec. Fonts

Two additional option buttons are included in the Tools Ribbon on the *Reduced Data Graph Window*. These two buttons control the size of the fonts displayed on graphs, dialog boxes, and menu options.

With the advent of ultra-high definition monitors, PC screen resolutions have increased to the 4k level and beyond. When running at these resolutions, application text is often displayed in a font size that is too small to be legible. While Windows provides auto-scaling options, the results are often unacceptable. The **Fonts** buttons attempt to provide a GUI interface that is customizable to the user's preference.

The App was designed for a 1080p screen resolution (1920 x 1080), with default font sizes chosen for that resolution. When running on a system with a 1080p monitor, there may be no need to change the font sizes. When using the App on higher resolutions, the displayed fonts may be too small. Each time the **Inc. Fonts** button is clicked, App font sizes are increased. Increasing fonts past a certain size is counter-productive, so a limit is in place. When fonts are at their maximum value, the **Inc. Fonts** button is disabled.

The **Dec. Fonts** button works the same way, decreasing font size with every click. Decreasing fonts past a certain size is counter-productive, so a limit is in place. When fonts are at their minimum value, the **Dec. Fonts** button is disabled.

Menu Bar

The Application Menu Bar is displayed on *Reduced Data Graph Window*. *Menu Bar* sub-menus are described here.

File Menu

Options in the *File Menu* allow the user to save the current data (in multiple formats), open new data files, and connect to the Vib Tool for data upload.

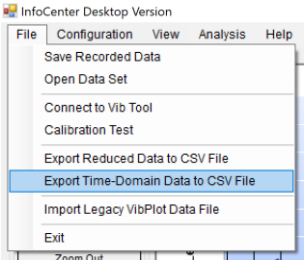

Figure 11 - File Menu

File Menu - Save Recorded Data

A standard Windows *Save File As* dialog box is displayed. The currently graphed data set will be saved to the entered filename in the InfoCenter App file format. Files saved in this format can only be accessed by the InfoCenter Desktop App.

File Menu - Open Data Set

A standard Windows *Open File* dialog box is displayed. The selected data file is loaded and graphed. The selected data file must be in the InfoCenter App file format.

InfoCenter App data files are stored with a **.VIB** file extension. Data files uploaded from a connected Vib Tool are automatically stored in the **Data\RDU** folder under the installation folder (typically **C:\GCI-InfoCenterApp (Desktop)**).

File Menu - Connect to Vib Tool

The *Connect to Vib Tool* option first displays a *Password Request* dialog box. When the correct password is entered, the InfoCenter Desktop App provides additional option buttons that can be used to download firmware files to a connected Vib Tool.

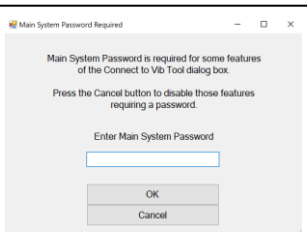

Figure 12 - Password Request

This is only used when new Vib Tool firmware versions are released by GCI and emailed to the end user, along with instructions for reprogramming the Vib Tool in the field. For normal operations, simply press the **Cancel** button on the password request dialog box.

When the password request dialog box is cleared, the *Connect to Vib Tool* dialog box is displayed. This box shows a drop-down list of available communications ports. Connect the Vib Tool to an available port using the supplied 9-Pin, M/F cable. Power on the Vib Tool and navigate its menu system to the **CONNECT PC APP** menu. Press the Vib Tool ENTER key to display **USE PC APP MENU / ENTER TO ABORT**.

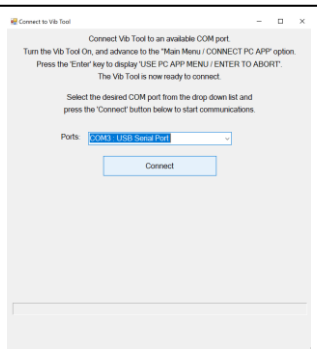

Figure 13 - Connect to Vib Tool Screen

Select the desired communications port from the drop-down list and click the **Connect** button.

If the PC fails to connect to the attached Vib Tool within a short timeout period, an error message is displayed. If this happens, verify that the Vib Tool is powered up and displaying the **USE PC APP MENU / ENTER TO**

ABORT message. Also verify that the Vib Tool is connected to the selected communications port and that the cable is connected properly.

Once connected, the PC requests a list of recorded data files from the Vib Tool. The files are displayed in a drop-down list, sorted by file date. Note: file date is based on the Vib Tool's internal clock setting at the time recording was started. If the internal clock was not configured properly at that time, the file time / date stamp may show a file date of 01/01/2000 (or similar).

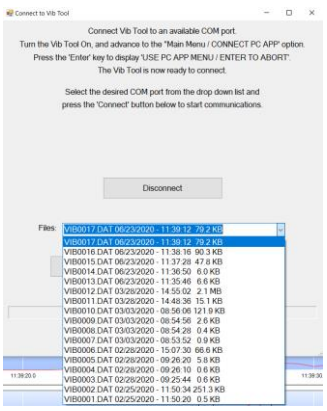

Figure 14 - Recorded File List

Connect to Vib Tool - Upload Data File

To upload a recorded data file, select it from the drop-down list and press the **Upload** button. A message is added to the dialog box showing the estimated upload time.

Long On-Board Reduction Mode recordings create large data files, and even short Time Domain Mode recordings can get very large. Upload baud rate is set to 115200, which is the fasted serial communications speed supported by most PC COM ports, but large files can still take a long time to upload.

The Vib Tool monitors battery levels during recording and automatically powers off when levels become too low. When this happens, the recording data file is closed. Older versions of the Vib Tool firmware had a problem with properly closing the data file in this situation, causing an invalid file size to be reported.

Figure 15 - Large File Warning

The InfoCenter Desktop App detects files selected for upload that have this size issue and warn the user that the upload process will attempt to fix the data file. Normally, data files are completely uploaded. For an improperly closed file, that would be 100+ MB of data, most of which does not contain valid vibration recordings. Instead, the upload process terminates the upload (and closes the file) when the uploaded data indicates no additional vibration data is present. An extra warning dialog box is displayed for this situation.

Once the upload process begins, a progress bar is displayed and is updated while the data file is uploaded. An upload percent indicator is also displayed (below the progress bar). This indicator will count-up from zero to 100 percent. Note that for very large

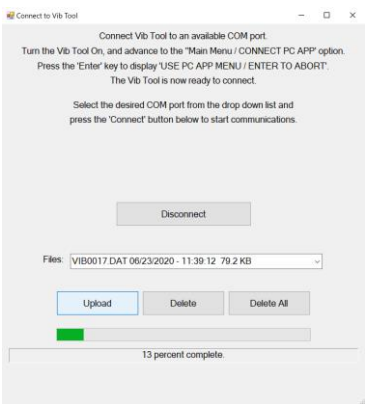

Figure 16 - Upload Percent

data files, it may take some time before the estimated upload time message is replaced with the first percent complete message.

Data files from an upload session are automatically named by the InfoCenter Desktop App. Reduced data is stored in **Data\RDU** folder. The raw data file is stored in the **Data\RAW** folder. Filenames start with the Vib Tool's four-digit serial number, followed by a date and time stamp code, followed by the InfoCenter Desktop App ID (typically VTIC-Desk). The raw data file will have the same name as that listed on the Vib Tool file drop down list and will be of the form **VIB####.DAT**. This file is not used once data reduction (if required) is complete. It is left on the PC for archival purposes only.

Additional data files are automatically generated and stored in the **Data\CSV** folder. These files duplicate the CSV file formats described in the OHT version above.

Once the data file has been uploaded, a dialog box is displayed showing the location of the raw data file.

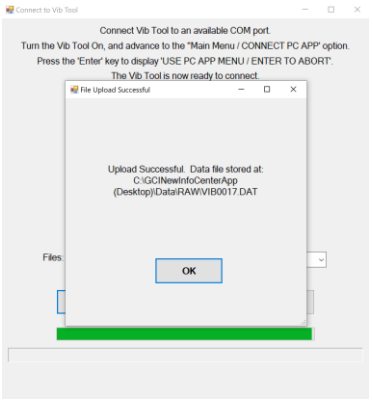

Figure 17 – Raw Data File Location

When a Time Domain Mode data file is uploaded, the InfoCenter Desktop App immediately reduces the data using the same techniques used during On Board Reduction Mode. The reduced data is stored in the **Data\RDU** folder and is graphed within the InfoCenter Desktop App.

Multiple files are saved on the PC following a Time Domain Mode file upload. The reduced data is stored in the **Data\RDU** folder. Raw uploaded data files are stored in the **Data\RAW** folder. Raw files include a legacy time domain data file that is compatible with the VibPlot App. All VibPlot graphing options have been incorporated into the InfoCenter Desktop App, but the legacy file is still produced for those customers who prefer to use the VibPlot App. The Desktop App appends the string **-Legacy** to the file name and saves it with a **.DAT** file extension.

When using VibPlot to directly open a time domain data file uploaded by the InfoCenter Desktop App, only those files with **-Legacy** in the file name will be displayed properly.

Finally, the filename for the reduced data set, either directly uploaded from the Vib Tool, or calculated from time domain data uploaded form the Vib Tool, is displayed.

Two additional option buttons are included on the *Connect to Vib Tool* dialog box.

Connect to Vib Tool - Delete Data File

The Vib Tool has a limited amount of internal flash memory to store vibration recordings. While there is plenty of room to record dozens of data sets, it may become necessary to clean off old data files. There are two options for doing this.

The first is the **Delete** button. It is used to delete a single data file from the Vib tool. Select the desired data file from the drop-down list and press the **Delete** button. Note that there is no confirmation warning. The selected file is deleted as soon as the **Delete** button is clicked. After the deletion is completed, a message is displayed, and the file list is updated.

Connect to Vib Tool – Delete All Data Files

The second option for deleting files removes all files from the Vib Tool. Again, this option does not display any confirmation warnings. As soon as the **Delete All** button is clicked, the delete process begins. Status messages are displayed showing the progress of the *Delete All* process.

It takes a few seconds to delete multiple data files. Please wait until the completed message is displayed. The drop-down list will then show a message saying the Vib Tool contains no data files.

Connect to Vib Tool - Disconnect

There is only one option to disconnect the Vib Tool from the PC. Once connected to the InfoCenter Desktop App, the Vib Tool keypad is locked. Use **Disconnect** button to close the connection and return Vib Tool to its Main Menu.

If something happens that locks communications between the Vib Tool and the PC, and the **Disconnect** button does not function properly, cycle power on the Vib tool to break the connection. You may have to terminate the Desktop App using Windows Task Manager if this happens.

File Menu - Export Reduced Data to CSV File

This option displays the *Export to CSV* dialog box. This box is used to set export options related to location tag processing. Modify desired settings, then click the **Export to CSV** button to create the CSV file.

Figure 18 - Export to CSV

The InfoCenter Desktop App creates several CSV files during the *Data Upload* process, using configuration settings in place at that time. This option allows the user to define new settings to apply to a CSV export file. Select a reduce data type (*RMS and Legacy RMS*, *Peak*, or *True RMS*) by clicking the associated radio button. Set the desired Warning and Error Limits for that data type in the associated fields, then click the **Export to CSV** button. Click the **Cancel** button to cancel the CSV export process.

The created CSV file contains header information detailing the recorded data set followed by one record for each reduced data record. Each record is prefixed with a *Record Type* code, which describes how vibration data values in that record align with the defined Warning and Error Limits, for the selected data type.

Records containing vibration data that fall below the Warning Limit is labelled with a 'V', indicating normal vibration record within spec. Records containing vibration data that matches or exceeds the Warning Limit but fall below the Error Limit are labelled with a 'W', indicating a vibration record in the

warning range. Records containing vibration data that matches or exceeds the Error Limit are labelled with an 'E', indicating a vibration record in the error range.

Global settings for Warning and Error Limits are made using the *Set Vib Limits* option under the *Configuration* menu. The *Export to CSV* dialog box allows the user to adjust those settings specifically for a newly created CSV file.

See the section below for the *Set Vib Limits* option for details on setting these levels.

Once the **Export Data** button is clicked, a standard Windows *Save As* dialog box is displayed. The filename is defaulted based on the data type selected and the main data file name. Modify the filename as desired and navigate to the desired folder, the press the **Save** button to create the CSV file.

File Menu - Export Time-Domain Data to CSV File

This option is available only when viewing data files recorded in Time Domain Mode. It allows the user to export the Time Domain data to a CSV file.

The created CSV file contains one record for each time-domain data point, recorded at 512 Hz. Each record contains the time offset from the start of recording (first data point has time of 0.0), along with the X, Y, and Z time domain data points recorded at that time offset.

A standard Windows *Save As* dialog box is displayed. The filename is defaulted based on the main data file name. Modify the filename as desired and navigate to the desired folder, the press the **Save** button to create the CSV file.

File Menu – Import Legacy VibPlot Data File

This option allows the user to import a data file that was previously uploaded using the VibPlot App. The VibPlot App uses a different file format than the InfoCenter Desktop App. These data files cannot be opened directly by the Desktop App. Instead, the data must first be converted into the InfoCenter Desktop App file format.

When this option is selected, a standard Windows *Open File* dialog box is displayed. Navigate to the location of the desired VibPlot data file and select it. The data file is converted and stored using the default file naming convention) in the **Data\RDU** folder. Once converted, the file can be opened normally using the InfoCenter Desktop App.

File Menu - Exit

The *Exit* option provides the user with a second method for closing the InfoCenter Desktop App. This option works identically to the **Close** button (when the *Reduced Data Graph Window* is displayed). The application can also be closed using the close window icon (x) located in the upper right corner of the application window.

Configuration Menu

The *Configuration* menu contains options for setting vibration location tag display limits, statistic details , and System Management settings.

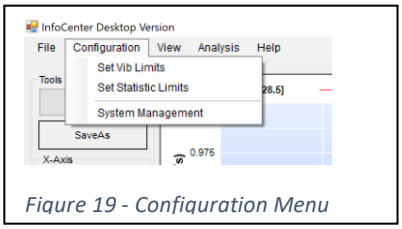

Figure 19 - Configuration Menu

Configuration Menu - Set Vib Limits

The *Set Vib Limits* option brings up a dialog box that can be used to set vibration limits that are used while displaying location tag information.

Location tags can be recorded at a rate up to ten per second. Graphing all received tags could muddy the *Graph Window* and not provide helpful information. This dialog box allows the user to define the vibration Warning and Error Limits, which limit the number of tags displayed. The user can also select which reduction type is used to limit tag display.

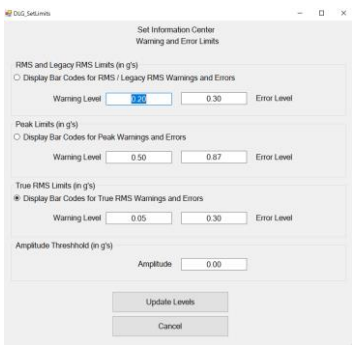

Figure 20 - Set Vibration Limits

Select the reduction type by clicking one of the three radio buttons – **RMS** / **Peak** / **True RMS**. Enter a value in the associated fields for Warning and Error Limits (minimum of 0.03). Tags associated with data points of that reduction type that are below the Warning Limit are not displayed. Tags associated with data points that are between the Warning and Error Limits, are displayed in Black. Tags associated with data points equal to or greater than the Error Limit are displayed in Red.

The final option field in this dialog box is the Amplitude Threshold value. This value is used to compute the 'N' reduction type (which is not graphed but is included in associated .CSV files). This data type represents the number of frequency bins for that sample period that exceed this setting.

Configuration Menu - Set Statistic Limits

The Set Statistic Limits option brings up a dialog box that can be used to set a set of statistic limits for each data type.

Up to three statistics values can be displayed on each *Reduced Data Graph*. These statistics compute the percentage of data of that type that fall below the entered values. A zero entered in any field disables that Statistic Limit, which prevents it from being calculated and displayed.

Figure 31 shows an example Reduced Data Graph Window with Statistics data displayed. The Statistic Limit for each graph type is shown as a dashed, red line in the associated graph, positioned at the limit value. For example, Figure 31 shows *Legacy RMS Statistic Limits* at 0.25 and 0.5 g's. This matches the Limit 1 and Limit 3 fields in the Set Statistic Limits dialog box shown in Figure 21. The Limit 2 field for this data type is set to zero (0) and not displayed.

Peak Statistic Limits are shown at 0.10, 0.20, and 0.25 g's.

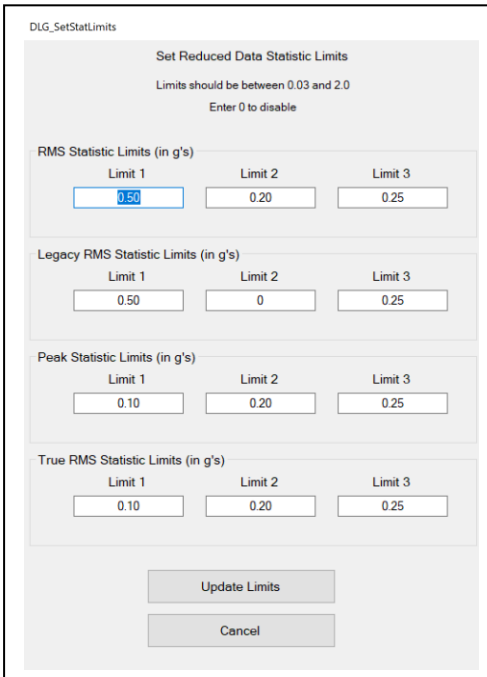

Figure 21 - Set Statistic Limits

The actual statistic values are displayed below each graph type, at the far right of the *Graph Window*. In this case, the *Legacy RMS Graph* shows that 90% of the *Legacy RMS* data points fall below the 0.50 g's limit, and 85% fall below the 0.25 limit. The *Peak Graph* shows that 93% of the *Peak* data points fall below the 0.10 g's limit, while 99% fall below 0.20 g's and 0.25 g's. The *TrueRMS Graph* shows that 58% of the *True RMS* data points fall below the 0.10 g's limit, while 77% fall below 0.20 g's and 86% fall below 0.25 g's.

The **Hide Stats** button in the *Reduced Graphs Tools Ribbon* are used to add or remove statistics details from the *Reduced Data Graphs*. When this checkbox is unchecked, statistics details are displayed on each graph. When checked, statistics details are hidden.

Configuration Menu – System Management

Selecting the *System Management* option brings up a password request screen. This screen prevents un-authorized changes to system settings. The default Main System Password is 'gci' (without the ' characters). Only authorized personnel should be given this password.

When the correct password is entered, and the **Login** button is clicked, the *System Management* dialog box is displayed.

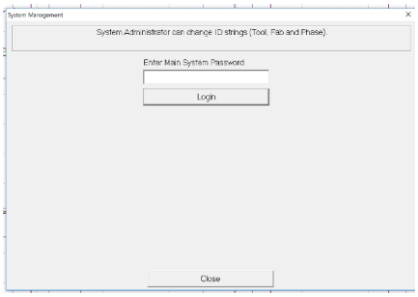

Figure 22 - System Management Password Request

This dialog box allows the user to set three system parameters. These parameters are used primarily with the OHT version of the InfoCenter App to define the ID and location of the InfoCenter dual load port tool. They can also be set in the Desktop version, though only the Fab Tool ID is used. All three are free-format text fields. The three settings are updated when the **Update Settings** button is clicked.

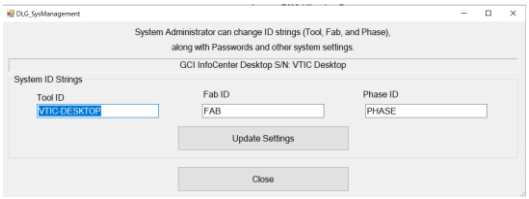

Figure 23 - System Management Screen

Tool ID

Tool ID is an identifier that defines the ID of this installation of the Desktop App. It is included in all filenames saved during the data file upload process.

Fab ID

Fab ID is used to define the Fab where the InfoCenter dual load port tool is installed. This field is not used in the Desktop version.

Phase ID

Phase ID This setting is used to define the Fab Phase (or floor) where the InfoCenter dual load port tool is installed. This field is not used in the Desktop version.

View Menu

The *View* menu provides the option of adding the Resultant Amplitude to the *RMS* and/or *Peak* graphs. This menu is also used to display several types of *Time Domain Graphs* available when viewing a Time Domain Mode data file. One additional option is shown that sets *BCL Data Options*. This option is reserved for future use and is currently disabled.

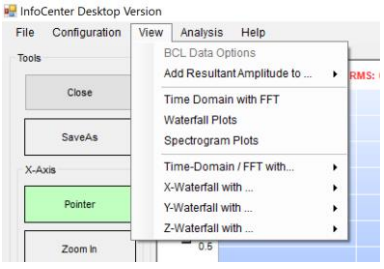

Figure 24 – View Menu

Resultant Amplitude

The Resultant Amplitude is defined as the square root of the sum of squares of the three axes data points ($r = \sqrt{X^2 + Y^2 + Z^2}$). The Resultant can be added to the *RMS*, *Legacy RMS* and *Peak* graphs. In each case the calculation is based on the amplitudes of that data type:

$$RMSr = \sqrt{RMS_x{}^2 + RMS_y{}^2 + RMS_z{}^2}$$

$$LegacyRMSr = \sqrt{LRMS_x{}^2 + RMS_y{}^2 + LRMS_z{}^2}$$

$$PEAKr = \sqrt{Peak_x{}^2 + Peak_y{}^2 + Peak_z{}^2}$$

When the *Add Resultant Amplitude to…* option is selected, a sub-menu is displayed showing the three graph types that support the Resultant calculation: *RMS Graph*, *Legacy RMS Graph*, and *Peak Graph*. The items in this sub-menu are check-box type options. When enabled, the option will have a check mark displayed to the left of the option name. When disabled, no check mark is displayed. Changes in this sub-menu trigger an update to the system configuration file, making these settings persistent through software shutdown and restart.

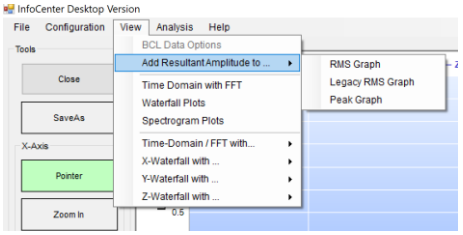

Figure 25 - Add Resultant Options

Analysis Menu

The *Analysis* menu contains options that affect the data reduction of time domain data. When selected, each of these options trigger a recalculation process of the time domain data, followed by a redisplay of all graphs.

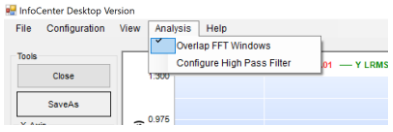

Figure 26 – Analysis Menu

When either of these options are enabled, a prompt is displayed in the top of *Reduced Graph* on each *Graph Window*. This prompt shows that the displayed data is from Overlapped FFT Windows, and the current *High Pass Filter* value.

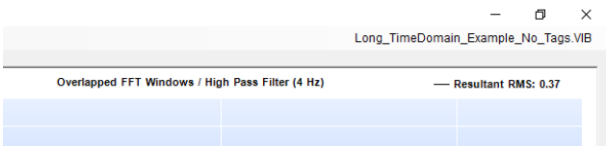

Figure 27 - Overlapped / HPF Prompt

Overlap FFT Windows

Overlap processing is useful when the time-domain data contains transients. The *Overlap FFT Windows* options provides a 2/3 overlapping. Normal processing of time domain data takes consecutive ½ second time-slices to compute FFTs of the data set. Overlap processing computes the half second averages and frequency-domain data on one-sixth second time-slices by overlapping each half second average window on one-sixth second intervals. This results in one-sixth second time slices with triple the number of averaged points than non-overlapped calculations.

When enabled, a checkmark is displayed next to the *Overlap FFT Windows* option in the *Analysis* Menu. To return to non-overlapped processing (which is the default), select the menu option again. The check mark will be removed, and the data will return to the original calculated values.

Configure High Pass Filter

The *Configure High Pass Filter* option can be used to filter out low frequency data from displayed graphs. When this option is selected, the *Configure High Pass Filter* dialog box is displayed.

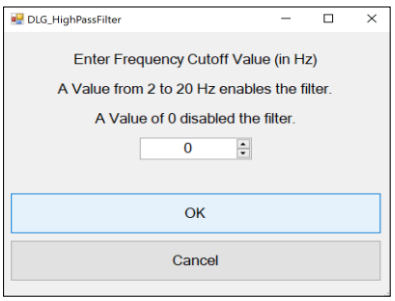

Figure 28 - Define High Pass Filter

A value from 2 and 20 Hz will enable the high pass filter, and null out the amplitude data from frequencies between 0 and the entered value.

Entering a zero will disable the high pass filter.

All graphs are refreshed when this dialog box is closed.

Help Menu

The Help menu contains a single option – *About GCI InfoCenter App*. This option brings up a dialog box that displays the application version number along with the path to the folder containing the Data folder structure (typically the installation folder).

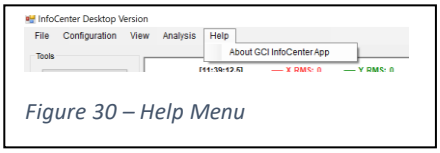

Figure 30 – Help Menu

This dialog box also displays the current license status, including entry fields for the License Code, Company Name and Email Address. The PC Name is also displayed.

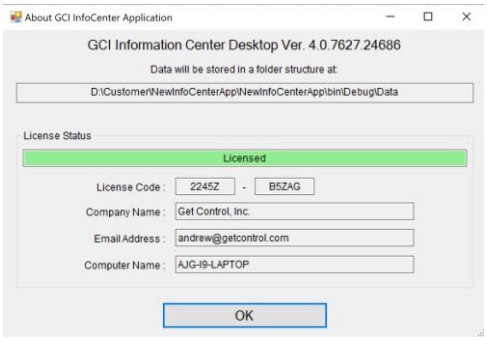

Figure 29 – About GCI InfoCenter Application Dialog Box

If the thirty-day trial period is still in force, these fields can be modified by the user. Option buttons are displayed that allow the user to generate the Key Request File and to Register the Key File. See the section above on licensing for details on the licensing process.

Once the software has been licensed, the entry fields show the data used in the licensing process and are no longer changeable.

Reduced Data Graph Window

Figure 31 – Reduced Data Graph Window

The *Reduced Data Graph Window* is the window displayed when the application first starts. It is the only *Graph Window* that includes the *Application Menu Bar*.

This window shows *Reduced Data Graphs* from the last data file viewed. It is split into three graphs, plus a *ViewPort* graph (described below). The *Legacy Mode RMS Graph* is displayed at the top followed by the *Peak Graph* and the *True RMS Graph*. These three graphs represent the data types provided by the Vib Tool's On-Board Reduction Mode recording option.

Legacy RMS and *Peak Graphs* display one data point per axis for each ½ seconds of time-domain data.

The *True RMS Graph* displays a single data point for each ½ seconds of time-domain data.

$$LRMS_x = \sum A_x[f]$$

$$LRMS_y = \sum A_y[f]$$

$$LRMS_z = \sum A_z[f]$$

Legacy RMS Calculation

Legacy RMS Graph

The *Legacy RMS Graph* displays data based on the RMS calculation provided by On-Board Reduction. This graph displays a single legacy RMS (summing) value (in g's) for each axis, for each 75-point frequency spectrum.

Peak Mode

The *Peak Graph* displays the peak amplitude value for each axis, for each 75-point frequency spectrum.

$$Peak_x = MAX(A_x[f])$$
$$Peak_y = MAX(A_y[f])$$
$$Peak_z = MAX(A_z[f])$$

Peak Calculation

True RMS Mode

The *True RMS Graph* displays a single True RMS value (in g's) for all three axes, for each 75-point frequency spectrum.

$$TrueRMS = \sqrt{\sum (A_x[f])^2 + \sum (A_y[f])^2 + \sum (A_z[f])^2}$$

True RMS Calculation

Each graph is titled with the reduced data type it displays. Reduced data is available for all three physical axes, X, Y, and Z. X-Axis vibration data is displayed in red; Y-Axis vibration data is displayed in green; Z-Axis vibration data is displayed in blue. True RMS data is also displayed in red.

The **Screen Cursor** (described above in the **Pointer** section) starts out at the first data record. The record timestamp is displayed at the top of each graph, along with the X, Y, and Z Axis data point from that record. When enabled, the Resultant Amplitude value is also displayed at the far right of the *Graph Window*.

The X-Axis for all three graphs is the recording time stamp. The X-Axis is not labelled at the X/Y intercept. The first X-Axis tick mark is labelled with both the date and time. Remaining X-Axis tick marks are labelled with only the time.

The Y-Axis for all three graphs is the reduced data type vibration value in g's. Full scale for the Y-Axis is 2.0 g's.

ViewPort Graph

The *ViewPort Graph* is displayed at the bottom of the window. This graph shows the True RMS data for the entire recording session. This graph is used during X-Axis zoom operations to show the user the section of the data file that is currently being displayed. When the *Reduced Data Graphs* are displayed at their full X-Axis zoom level, the *ViewPort Graph* is identical to the *True RMS Graph*.

When the X-Axis has been "zoomed in", the *ViewPort Graph* shows a highlighted section that matches the area currently shown on the *Reduced Data Graphs*. This highlighted section can be moved using the mouse by 'clicking and dragging'. Changes to the location of the highlighted section affect the section of data displayed in the *Reduced Data Graphs*.

This allows the user to view the entire recorded data set while more closely analyzing a sub-section of records.

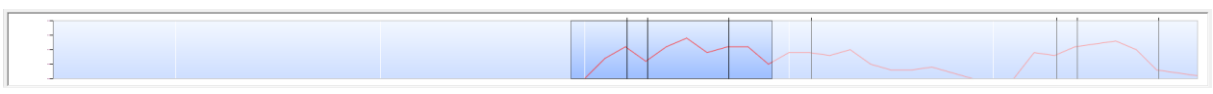

Figure 32 - ViewPort Graph

Time Domain with FFT Graph Window

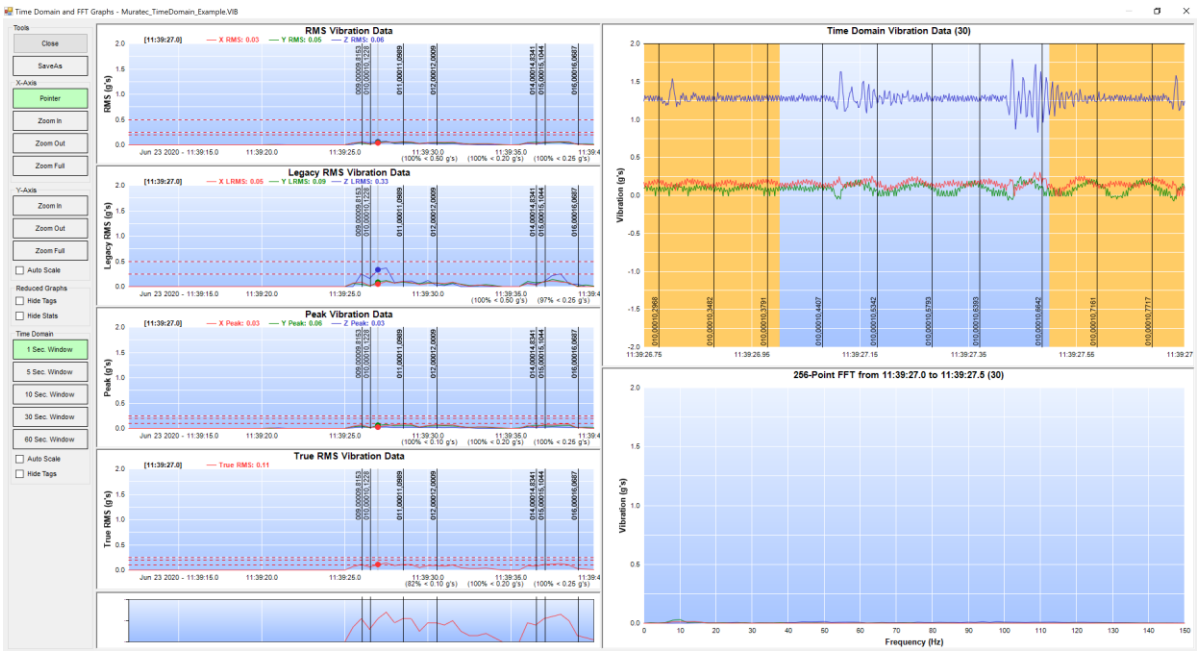

Figure 33 - Time Domain with FFT Graph Window

This window is displayed using the *View / Time Domain with FFT* menu option. Use the **Close** button to close this window and return to the *Reduced Data Graph Window*.

This window repeats the *Reduced Data Graphs* from the *Reduced Data Graph Window*, adding the *RMS Graph*. This graph is placed at the top of the left side of the *Graph Window*, above the *Legacy RMS*, *Peak* and *True RMS Graphs*. The *ViewPort Graph* is at the bottom of the *Graph Window*. These graphs function identically to those on the *Reduced Data Graph Window* (with the addition of the *RMS Graph*). *X-Axis* tool buttons in the *Tools Ribbon* affect only these graphs. The *Y-Axis* tool buttons affect these graphs along with the *FFT Graph* (described below). The *Reduced Graphs* tool buttons only affect these graphs.

Time Domain Tools

This *Graph Window* adds an additional section to the *Tools Ribbon* titled *Time Domain*. The option buttons in this section affect the *Time Domain Graph* shown at the upper right of the *Graph Window*.

1 Sec. Window

The *Time Domain Graph* can show up to five ranges of time domain data. This option button will set the *Time Domain Graph* to show one (1) second of time domain data, centered on the data associated with the reduced data record selected with the **Screen Cursor**. Unless the current record is the first or last, the *Time Domain Graph* will show 0.25 seconds of time domain data before and after the 0.5 seconds of time domain data associated with the reduced data record.

5 Sec. Window

This option button will set the *Time Domain Graph* to show five (5) seconds of time domain data, centered on the data associated with the reduced data record selected with the **Screen Cursor**. Unless

the current record is the first or last, the *Time Domain Graph* will show 2.25 seconds of time domain data before and after the 0.5 seconds of time domain data associated with the reduced data record.

10 Sec. Window

This option button will set the *Time Domain Graph* to show ten (10) seconds of time domain data, centered on the data associated with the reduced data record selected with the **Screen Cursor**. Unless the current record is the first or last, the *Time Domain Graph* will show 4.75 seconds of time domain data before and after the 0.5 seconds of time domain data associated with the reduced data record.

30 Sec. Window

This option button will set the *Time Domain Graph* to show 30 seconds of time domain data, centered on the data associated with the reduced data record selected with the **Screen Cursor**. Unless the current record is the first or last, the *Time Domain Graph* will show 14.75 seconds of time domain data before and after the 0.5 seconds of time domain data associated with the reduced data record.

60 Sec. Window

This option button will set the *Time Domain Graph* to show 60 seconds of time domain data, centered on the data associated with the reduced data record selected with the **Screen Cursor**. Unless the current record is the first or last, the *Time Domain Graph* will show 29.75 seconds of time domain data before and after the 0.5 seconds of time domain data associated with the reduced data record.

Auto Scale

The *Time Domain Graph* has a default Y-Axis scale of +/- 2 g's. The **Auto Scale** checkbox will set the *Time Domain Y-Axis* to auto-scale. When checked, the Y-Axis will auto-scale based on the data currently displayed. Unchecking this option box will return the *Time Domain Y-Axis* scale to +/- 2 g's.

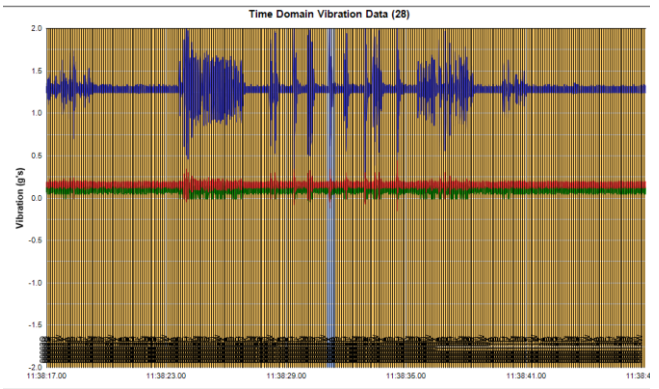

Figure 34 - Time Domain Graph with Tags

Hide Tags

The **Hide Tags** option can be used to remove the tag display in the *Time Domain Graph*. This cleans up the graph and makes it easier to examine the time domain data.

Figure 34 shows the *Time Domain Graph* with a *30 Second Window*. The selected data file has location tags recorded at a rate of nearly 10 times a second. At the *30 Second Window* setting, the location tags become useless and make analyzing the time domain data difficult.

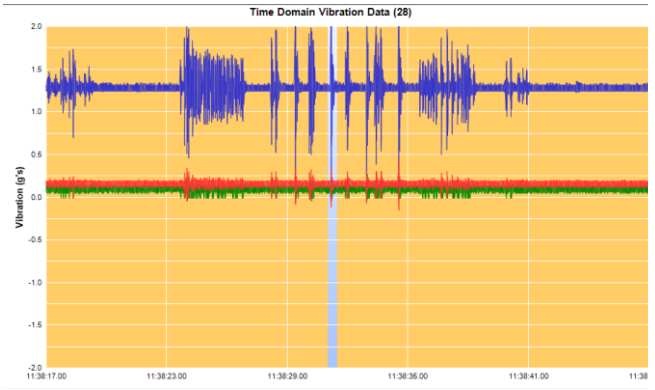

Figure 35 - Time Domain Graph without Tags

Figure 35 shows the same *Time Domain Graph* with the **Hide Tags** option checked. Removing the location tags from the graph makes the time domain data stand out better, making it easier to analyze.

Uncheck the Hide Tags checkbox to redisplay location tags in the *Time Domain Graph*.

RMS Graph

The *RMS Graph* displays a single RMS value (in g's) for each axis, for each 75-point frequency spectrum. This is an alternate RMS calculation available in the VibPlot App.

$$RMS_x = \sqrt{\sum (A_x[f])^2}$$

$$RMS_y = \sqrt{\sum (A_y[f])^2}$$

$$RMS_z = \sqrt{\sum (A_z[f])^2}$$

RMS Calculation

Time Domain Graph

The *Time Domain Graph* is displayed at the top right of the window. This graph shows the time domain data values related to the reduced data record associated with the **Screen Cursor**.

Each record in the *Reduced Data Graph* is related to 0.5 seconds of time domain data. The **Screen Cursor** starts out at the first reduce data record. The associated time domain data is shown with a blue background in the *Time Domain Graph*. The rest of the X-Axis scale is shown with an orange background. This allows the user to see the time domain data before, during and after the currently selected reduced data record.

As the size of the *Graph Window* is changed (using the *Time Domain* tool buttons), the orange section will grow. The blue section is fixed at 0.5 seconds of time domain data but will shrink in physical size as the graph displays more data.

Figure 33 shows the **Screen Cursor** near the middle of the *Reduced Data Graph* (at timestamp 11:39:27.0). The *Time Domain Graph* is centered on the time domain data associated with that reduced data record. The current setting shows 1 second of time domain data. The first and last 0.25 second of data has an orange background, indicating it is not associated with the selected reduced data record. The middle 0.5 second of the graph has a blue background. Data reduction on this set of time domain data results in the reduced data record at the **Screen Cursor**.

Figure 36 shows the same time domain data over a five (5) second display window. The blue background area of the graph is the same 0.5 second of time domain data seen above. The orange bands now show 2.25 seconds of time domain data before and after this section.

As the **Screen Cursor** is moved left and right within the *Reduced Data Graphs*, the *Time Domain Graph* is updated to show the time domain data associated with the reduced data record at the current **Screen Cursor** position.

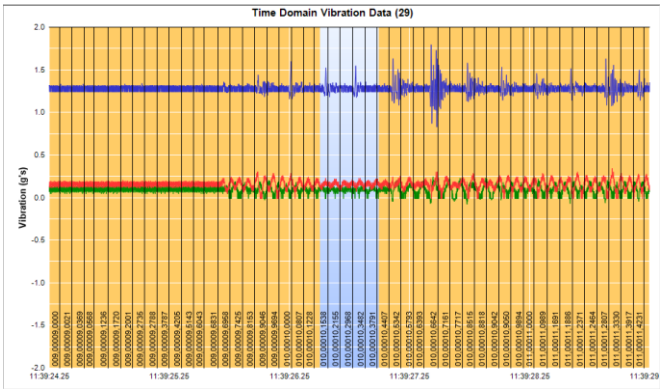

Figure 36 - 5 Second Time Domain Window

Location tags, when available in the data file, are also displayed on the *Time Domain Graph*. These are displayed as a vertical line with the tag text at the bottom of the graph. Use the **Hide Tags** button in the *Time Domain* tools section to hide location tags on the *Time Domain Graph*.

FFT Graph

The *FFT Graph* is displayed below the *Time Domain Graph*. This graph shows the results of a 256-point FFT on the currently displayed 0.5 seconds of time domain data in the *Time Domain Graph*. The FFT is performed to convert the time domain data into the frequency domain. The *FFT Graph* shows the amplitude of vibration data in 2 Hz bins between 0 and 150 Hz. This is the first step in the data reduction process that results in the reduced data records shown in the *Reduced Data Graphs*.

The *FFT Graph* Y-Axis is the amplitude in g's. The X-Axis is the frequency bins, from 0 to 150.

The FFT Y-Axis scale matches the Y-Axes of the *Reduced Data Graphs*. When the *Y-Axis* tool buttons are used to change the Y-Axis maximum value, the *FFT Graph* is updated. Additionally, if the **Auto Scale** checkbox is checked, the FFT Y-Axis will auto-scale.

Waterfall Graph Window

This window is displayed using the *View / Waterfall Plots* menu option. Use the **Close** button to close this window and return to the *Reduced Data Graph Window*.

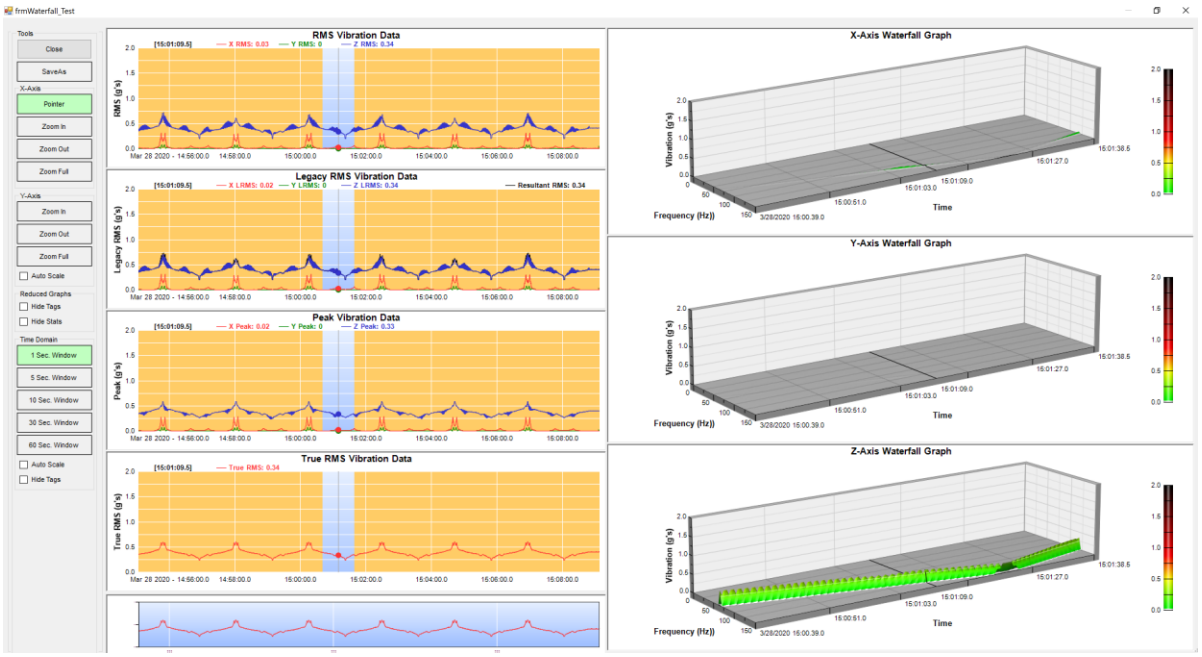

Figure 37 – Waterfall Graph Window

The *Waterfall Graph Window* repeats the *Reduced Data Graphs* described in the *Time Domain with FFT Graph Window*. These graphs function identically to those on the *Time Domain with FFT Graph Window* described above. *X-Axis* and *Reduced Graphs* tool buttons affect only these graphs. *Y-Axis* zoom tool buttons affect these graphs along with the *Waterfall Graphs*, but he **Auto-Scale** button only affects the *Reduced Data Graphs*.

Waterfall Tools

This *Graph Window* adds an additional section to the *Tools Ribbon* titled *Waterfall.* The option buttons in this section affect the *Waterfall Graphs* shown at the right side of the *Graph Window*. These graphs can show up to four ranges of FFT data, selectable using the four buttons in this section.

1 Min. Window

When selected, the *Waterfall Graphs* will show one (1) minute of FFT records, centered around the current **Screen Cursor** position.

5 Min. Window

When selected, the *Waterfall Graphs* will show five (5) minutes of FFT records, centered around the current **Screen Cursor** position.

10 Min. Window

When selected, the *Waterfall Graphs* will show ten (10) minutes of FFT records, centered around the current **Screen Cursor** position.

Full Window

When selected, the *Waterfall Graphs* will show the entire data set of FFT records.

Note, *Waterfall Graphs* contain a very large amount of data points. Updating *Waterfall Graphs* takes several seconds when using the **10 Minute Window** or **Full Window** settings. *Waterfall Graphs* help the user understand how vibration data changes over time but viewing *Waterfall Graphs* at these settings will cause slow screen updates.

Auto Scale

The **Auto Scale** option changes the *Waterfall Graphs* Z-Axis maximum between the current Y-Axis zoom level and an auto-scaled value. When checked, the Z-Axis maximum will be adjusted based on the currently displayed FFT data. When unchecked, the Z-Axis maximum will return to the current Y-Axis zoom level.

Figure 38 shows the *Waterfall Graphs* with the **Auto Scale** option checked.

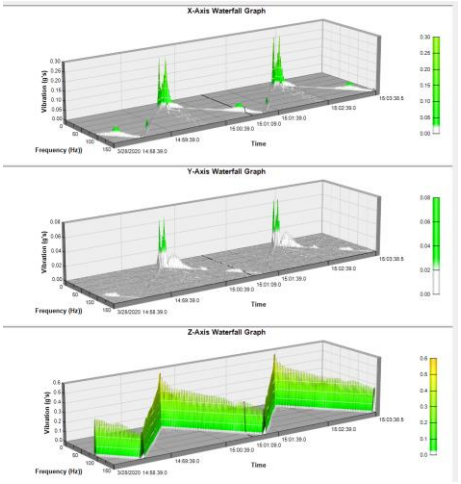

Figure 38 - Auto Scale Waterfall Graphs

Reduced Data Graphs

Figure 37 shows Waterfall graph with a one-minute window. The **Screen Cursor** is located towards the middle of the data set at time stamp 15:01:09.5. The *Reduced Data Graphs* are shown with a blue background covering one minute of reduced data records, centered on the **Screen Cursor**. The rest of the graphs are shown with an orange background. The blue background represents the reduced data associated with the currently displayed *Waterfall Graphs*.

As the **Screen Cursor** is moved left and right within the *Reduced Data Graphs*, the *Waterfall Graphs* are updated to include the FFT data from the one minute of reduced data shown in blue.

Figure 39 shows the changes that occur when switching to the five (5) Minute Window. Note that the orange bands are narrower on the *Reduced Data Graphs* and additional time is added to the *Waterfall Graphs*.

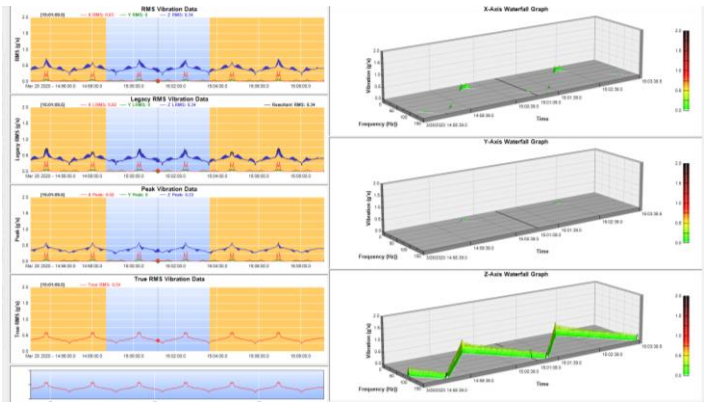

Figure 39 - 5 Minute Waterfall Graphs

Waterfall Graphs

Three *Waterfall Graphs* are displayed at the right side of the screen, one for each axes of vibration data, X, Y, and Z. *Waterfall Graphs* show vibration data in 3D, with recording time on the X-Axis (in seconds), Frequency on the Y-Axis (in Hz), and amplitude on the Z-Axis (in g's). The amplitude is also shown as a color gradient.

Very low amplitudes are displayed in white, moving into green and then yellow as the amplitudes approach the current *Peak Warning Limit* value (set using the *Configuration / Set Vib Limits* menu option). As amplitude levels continue to rise and approach the current *Peak Error Limit*, the color changes to red. Amplitudes above the *Peak Error Limit* continue to darken through the red spectrum to black. Figure 39 shows the color scale with a Warning Level of 0.5 g's and an Error Level of 1.0 g's. A color bar is displayed at the far right of the waterfall graph showing the way color represents amplitude levels.

The **Screen Cursor** is also shown on the *Waterfall Graphs* as a black line that moves through the graph aligned with the Frequency axis. The timestamp from the **Screen Cursor** location is displayed next to the Time axis.

The *Waterfall Graphs* show groups of FFTs for a give data set, stacked up, with time moving from left to right. The frequency bins start with 0 Hz at the back of the graph and increase up to 150 Hz at the front of the graph. This provides an interesting perspective on the changes in vibration amplitudes over time.

Spectrogram Plots Graph Window

This window is displayed using the *View / Spectrogram Plots* menu option. Use the **Close** button to close this window and return to the *Reduced Data Graph Window*.

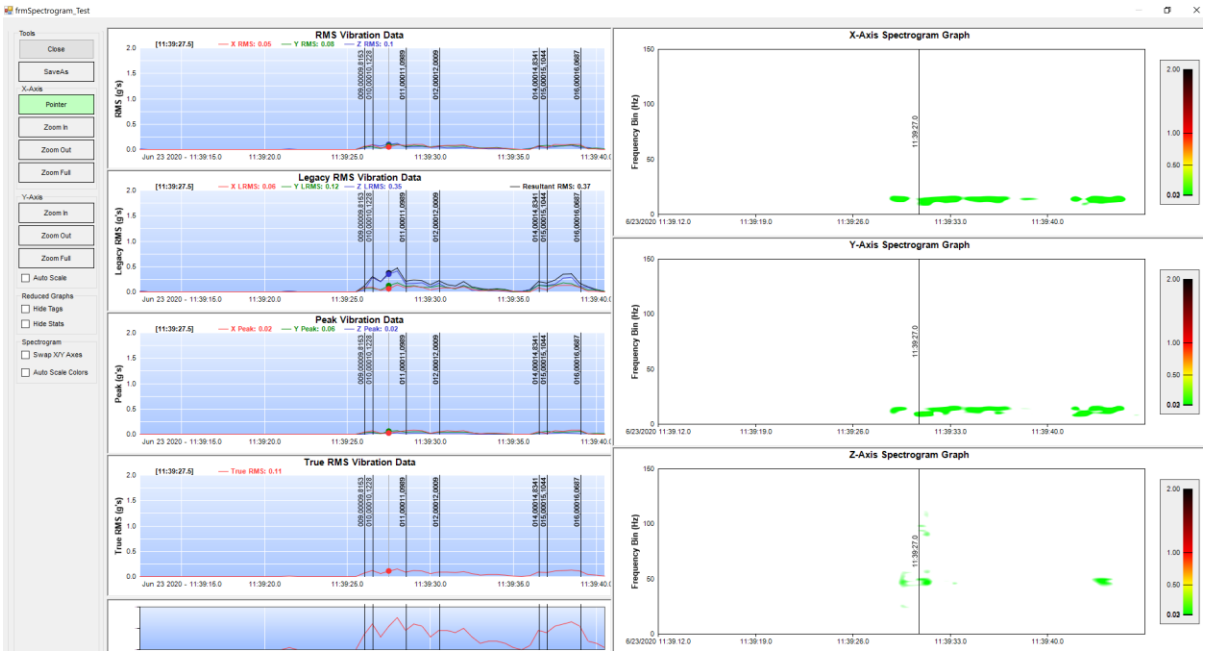

Figure 40 – Spectrogram Graph Window

The *Spectrogram Graph Window* repeats the *Reduced Data Graphs* described in the *Time Domain with FFT Graph Window*. These graphs function identically to those on the *Time Domain with FFT Graph Window* described above. *X-Axis* tool buttons affect these graphs along with the time axis of the *Spectrogram Graphs*. *Y-Axis* and *Reduced Graphs* tool buttons affect only these graphs.

Spectrogram Tools

This *Graph Window* adds an additional section to the *Tools Ribbon* titled *Spectrogram*. The option buttons in this section affect the *Spectrogram Graphs* shown at the right side of the *Graph Window*.

Swap X/Y Axes

When selected, the *Spectrogram Graphs* will show Frequency on the X-Axis and Time on the Y-Axis. When not selected, the graphs return to the default setting of Time on the X-Axis and Frequency on the Y-Axis.

Figure 41 shows the *Spectrogram Graphs* with the **Swap Axes** option checked.

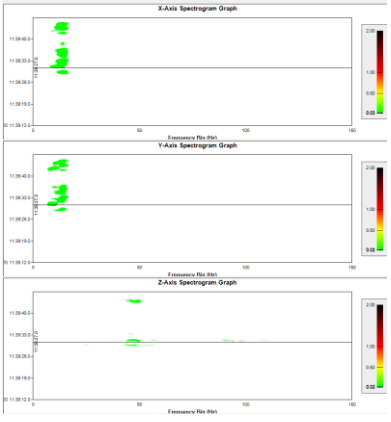

Figure 41 - Swapped Axes

Auto Scale Colors

When selected, the Spectrogram color range will be set to auto scale. This causes the color gradient used in the Spectrogram to switch from the default setting to an auto scale setting.

The default color gradient matches that used for the *Waterfall Graphs* describe above. Very low amplitudes are displayed in white, moving into green and then yellow as the amplitudes approach the current *Peak Warning Limit* value (set using the *Configuration / Set Vib Limits* menu option). As amplitude levels continue to rise and approach the current *Peak Error Level*, the color changes to red. Amplitudes above the Peak Error Limit continue to darken through the red spectrum to black. Figure 40 shows the color scale with a *Warning Limit* of 0.5 g's and an *Error Limit* of 1.0 g's. A color bar is displayed at the far right of the *Spectrogram Graph* showing the way color represents amplitude levels.

With the **Auto Scale Colors** option checked, the color gradient is changed to blue at very low amplitudes, then moving through green and yellow and ending in red for very high amplitudes.

Figure 42 shows *Spectrogram Graphs* with both options set (**Swap Axes** and **Auto Scale Colors**).

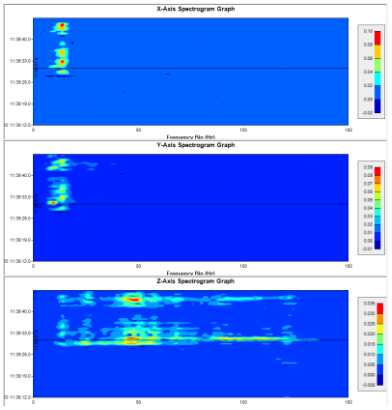

Figure 42 - Auto Scale Colors

Reduced Data Graphs

The *Reduced Data Graphs* are identical to those described in the *Time Domain with FFT Graph Window* section above.

Spectrogram Graphs

Three *Spectrogram Graphs* are displayed at the right side of the screen, one for each axis of vibration data, X, Y, and Z. *Spectrogram Graphs* show vibration data as a color spectrogram, with recording time on the X-Axis (in seconds), Frequency on the Y-Axis (in Hz), and amplitude as a color gradient. See the section on **Auto Scale Colors** above for a description of how amplitudes are related to color.

The **Screen Cursor** is also shown on the *Spectrogram Graphs* as a black line that moves through the graph aligned with the Frequency axis. The timestamp from the **Screen Cursor** location is displayed next to the Time axis.

The *Spectrogram Graphs* show groups of FFTs for a give data set, stacked up, with time moving from left to right. The frequency bins start with 0 Hz at the bottom of the graph and increase up to 150 Hz at the top of the graph. This provides another perspective on the changes in vibration amplitudes over time.

Single Reduced Data Time Domain / FFT Graph Window

An alternate *Time Domain Graph* option is available through the *View / Time-Domain / FFT with…* menu option. This option selects one of the four reduced data types (*RMS*, *Legacy RMS*, *Peak*, or *True RMS*) to display alongside the *Time Domain and FFT Graphs*. This creates a *Graph Window* that focuses on the FFT results for one specific reduced data type.

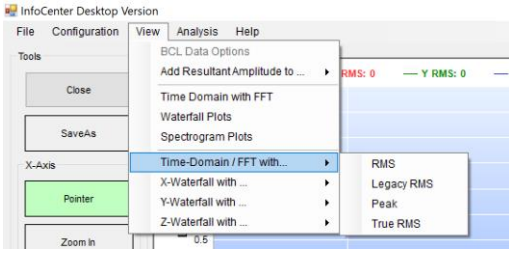

Figure 43 – Time-Domain / FFT with… Menu

The *Single Reduced Data Time Domain / FFT Graph Window* shows the selected *Reduced Data Graph* (described in the *Time Domain with FFT Graph Window*). This single graph functions identically to those on the *Time Domain with FFT Graph Window* described above. *X-Axis* and *Reduced Graphs* tool buttons affect only this graph. *Y-Axis* tool buttons affect this graph and the *FFT Graph*.

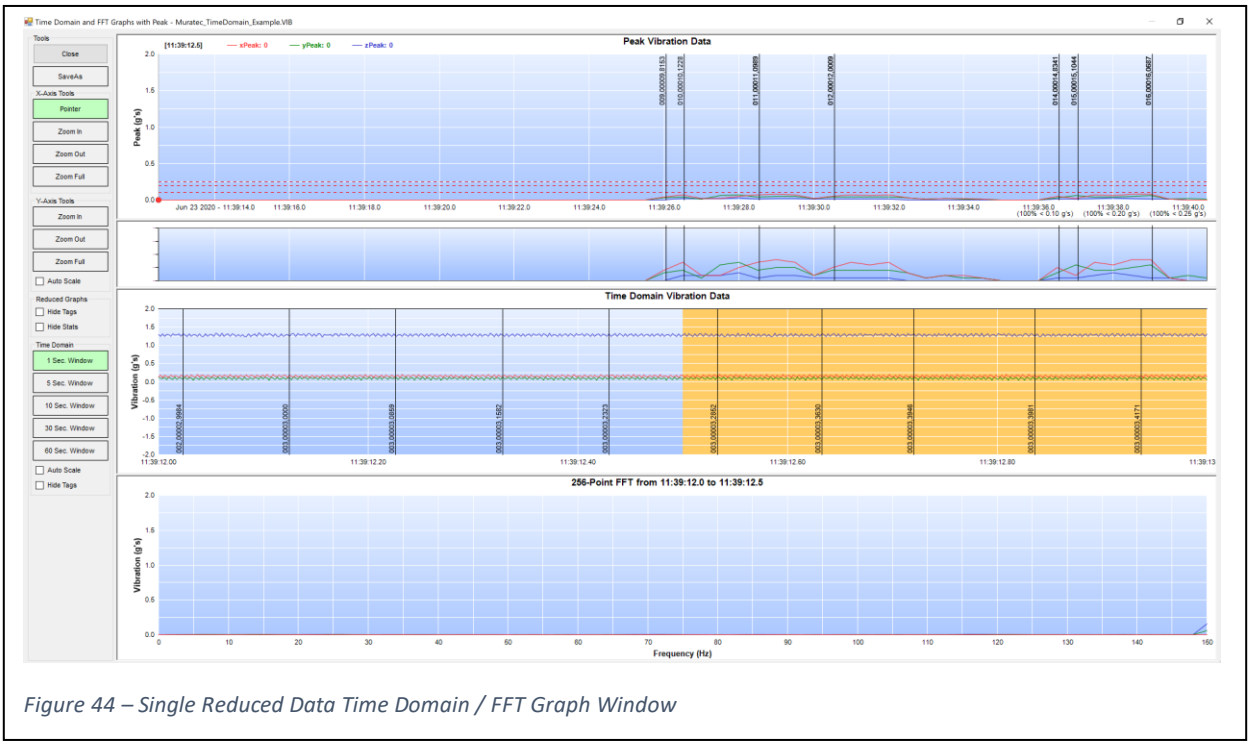

Figure 44 – Single Reduced Data Time Domain / FFT Graph Window

Time Domain Tools

This *Graph Window* adds an additional section to the *Tools Ribbon* titled *Time Domain*. The option buttons in this section affect the *Time Domain Graph* shown in the middle of the *Graph Window*. The tools available here are identical to those described above in the *Time Domain with FFT Graph Window* section above.

Reduced Data Graph

The single *Reduced Data Graph* operates the same as the four graphs on the *Time Domain with FFT Graph Window* described above. The only difference is the *ViewPort Graph* displays the selected reduced data type instead of the True RMS data (unless the True RMS data type was selected).

Time Domain Graph

The *Time Domain Graph* is displayed in the middle of the *Graph Window*. This graph shows the time domain data values related to the reduced data record associated with the **Screen Cursor**.

This graph functions identically to the *Time Domain Graph* described above.

FFT Graph

The *FFT Graph* is displayed at the bottom of the *Graph Window*. This graph shows the results of the 256-point FFT on the time domain data shown with a blue background in the *Time Domain Graph*.

This graph functions identically to the *FFT Graph* described above.

Single Axis Waterfall Graph Window

An alternate *Waterfall Graph* option is available through the three *View / n- Waterfall with…* menu options. Each option selects one of the three vibration axes (X, Y, or Z) for the *Waterfall Graph*, followed by one of the four reduced data types (*RMS*, *Legacy RMS*, *Peak*, or *True RMS*) for the *Reduce Data Graph*. This creates a *Graph Window* that focuses on the FFT results for one specific vibration axis related to one specific reduced data type.

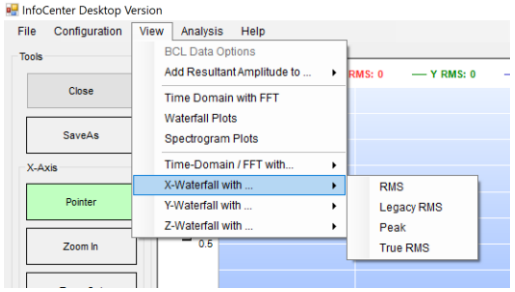

Figure 45 - X-Waterfall with… Menu

The *Single Axis Waterfall Graph Window* shows the selected *Reduced Data Graph* (described in the *Time Domain with FFT Graph Window*). This single graph functions identically to those on the *Time Domain with FFT Graph Window* described above. *X-Axis* and *Reduced Graphs* tool buttons affect only this graph. *Y-Axis* zoom tools affect this graph and the *Waterfall Graph*, but the **Auto-Scale** button only affects this graph.

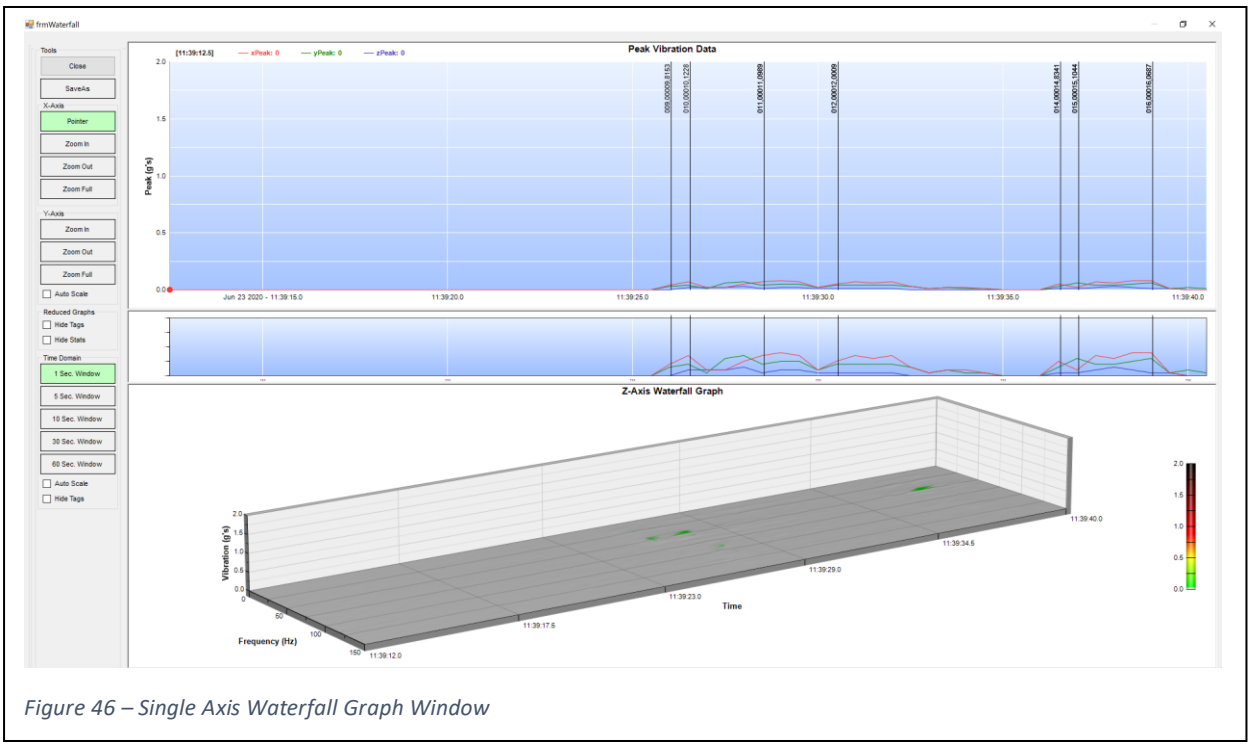

Figure 46 – Single Axis Waterfall Graph Window

Waterfall Tools

This *Graph Window* adds an additional section to the *Tools Ribbon* titled *Waterfall*. The option buttons in this section affect the Waterfall graph shown at the bottom of the *Graph Window*. The tools available here are identical to those described above in the *Waterfall Graph Window* section above.

Reduced Data Graph

The single *Reduced Data Graph* operates the same as the four graphs on the *Waterfall Graph Window* described above. The only difference is the *ViewPort Graph* displays the selected reduced data type instead of the True RMS data (unless the True RMS data type was selected).

Single Waterfall Graph

A single *Waterfall Graph* is displayed at the bottom of the screen showing the FFT data from the selected axis, with recording time on the X-Axis (in seconds), FFT values for each data record on the Y-Axis (in Hz), and amplitude on the Z-Axis (in g's). The amplitude is also shown as a color gradient.

Displaying a single axis at a time increases the graph size, which may help in analyzing a single axis