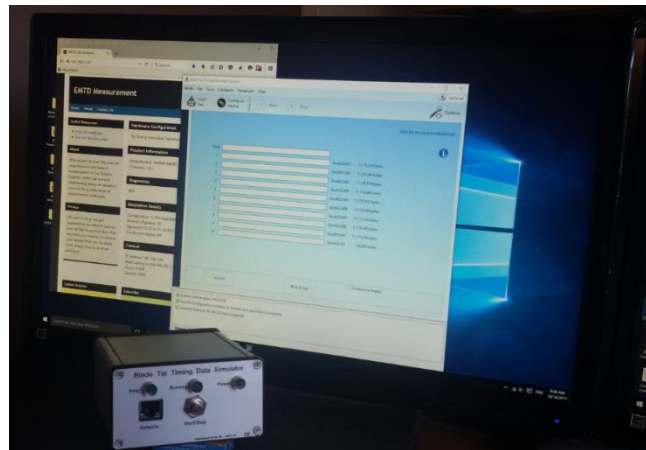


MultiTool Blade Tip Timing Acquisition, Analysis and Data Simulation Software

Replay Manual



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2. MultiTool Replay Mode

The Replay mode of MultiTool allows the user to view, play back, export and assess the recorded dataset. This is useful for validating the recorded data quality, validating the configuration is correct and providing a quick look at what activity there is in the file. The playback facility allows time to understand any events and/or add comments regarding the dataset. Data can be exported for further analysis or algorithm development and it can be cropped multiple times to isolate only the parts of interest.

Some MultiTool features are licensed separately. If the replay component of MultiTool has been licensed then it will be selectable from the Mode menu as shown in Figure 1. If this option is greyed and you believe that you have a valid license for replay then please email support@emtd-measurement.com

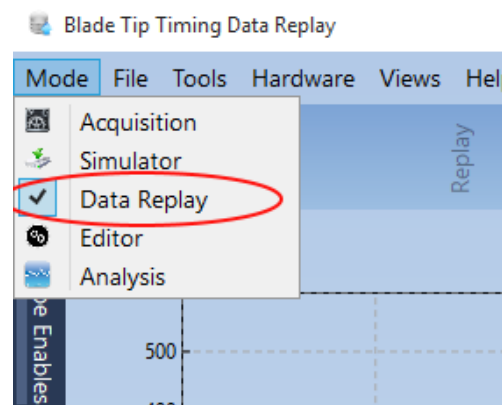


Figure 1 - Switching to Replay mode

2.1. Open Current Configuration Location

Once a configuration file has been loaded then this menu item will be enabled. It will open a new Windows Explorer window set to the current configuration files folder.

2.2. Loading a configuration file

In order to analyse a dataset a configuration file is required which describes the hardware configuration used to acquire the data. This must be a MultiTool standard configuration file and must be in the same directory as the data. If you don't already have one created then see Creating a Configuration file.

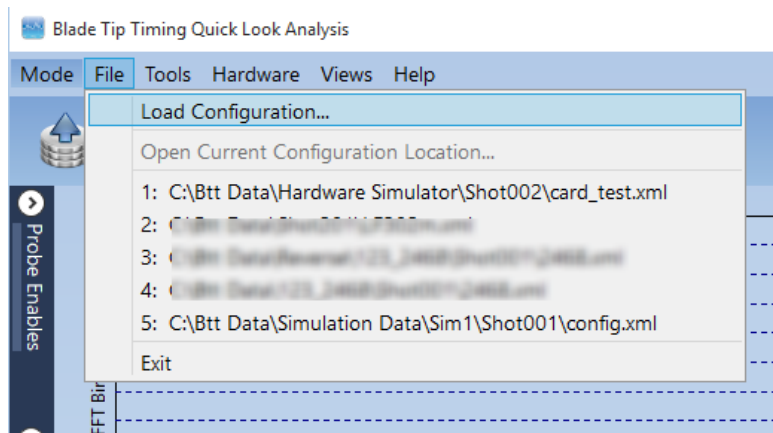


Figure 2 - Loading a configuration file

If the configuration file has been used before then it will appear in the recently used files list. Click on it to load. Note that the recent file list is different for each mode of the application so if you have loaded the file in the editor it will appear in the recent list but won't appear in the replay list until it has been loaded into the replay system once.

If the configuration file has not been loaded before then select [Load Configuration](#) from menu.

2.3.Data Validation

MultiTool will inspect the dataset and make sure it is good enough for replay. Any problems found will be reported in the status area at the bottom of the display. While some issues may be minor and are for information only any major issues will halt the process and must be fixed before the data can be replayed or analysed. An example of a major issue would be the probe positions described in the configuration file do not match the positions calculated from the data.

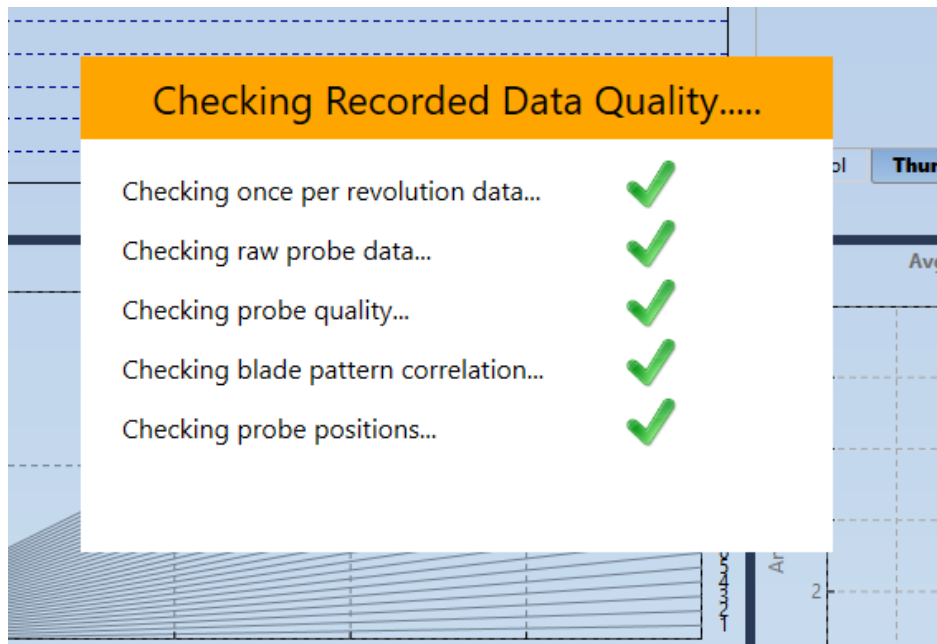


Figure 3 - Data Validation

Although MultiTool is fully multithreaded this can still take a little while depending on the size of the dataset.

Quick Load - Once a dataset has been successfully loaded once it will be marked as good. When this dataset is loaded again it will be quick loaded, bypassing the checking and speeding up the load process. Changing the configuration file will invalidate the quick load and cause a full check on the next load. If the dataset has data quality issues then the quick load will not be available until those issues are resolved. See relevant messages to aid in fixing any issues.

2.4.Replay Display Sections

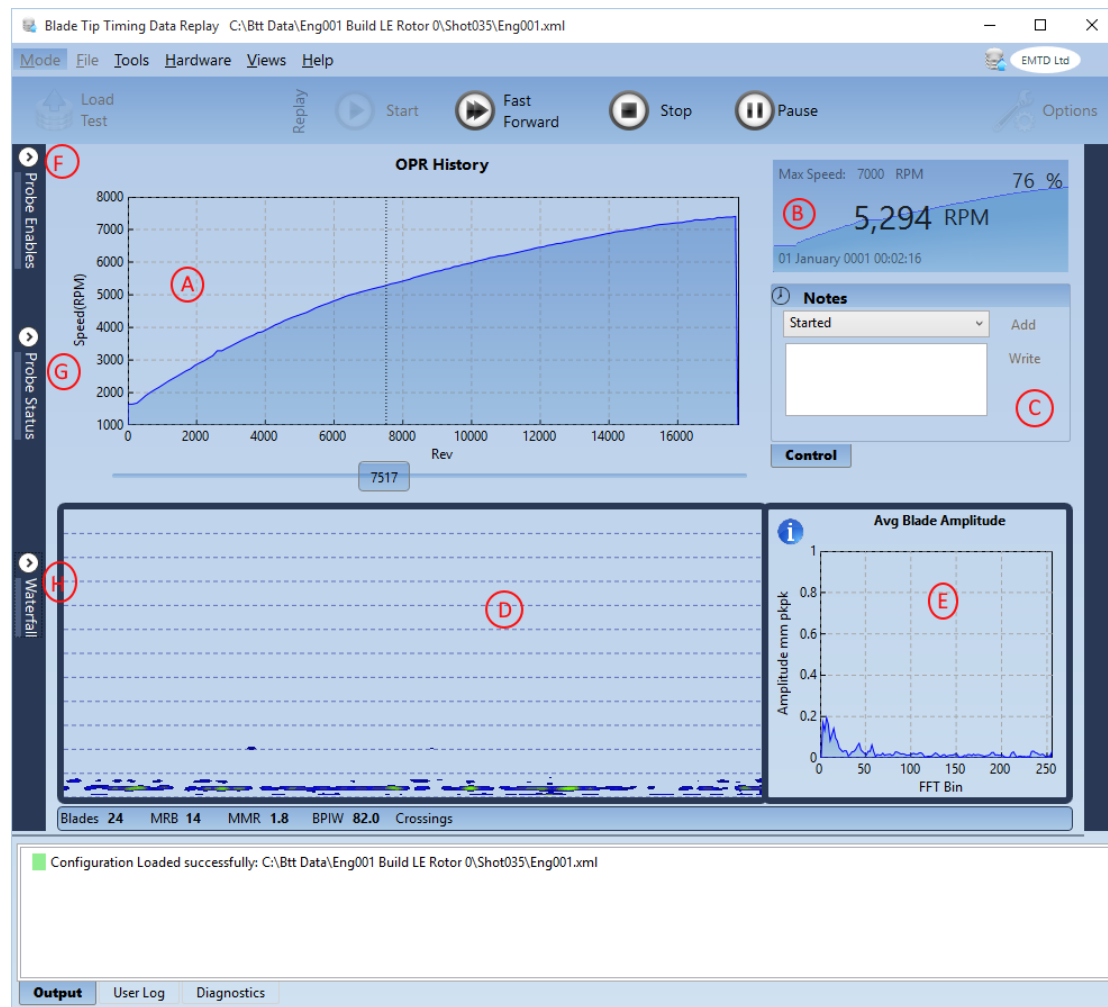


Figure 4 - Replay Display Sections

Once the dataset has been loaded the display will update similar to that shown in Figure 4 .



Extra help is available throughout MultiTool wherever there is an information icon. Hover the mouse over these icons to display useful information.

2.4.1. Once Per Revolution (OPR) display (A)

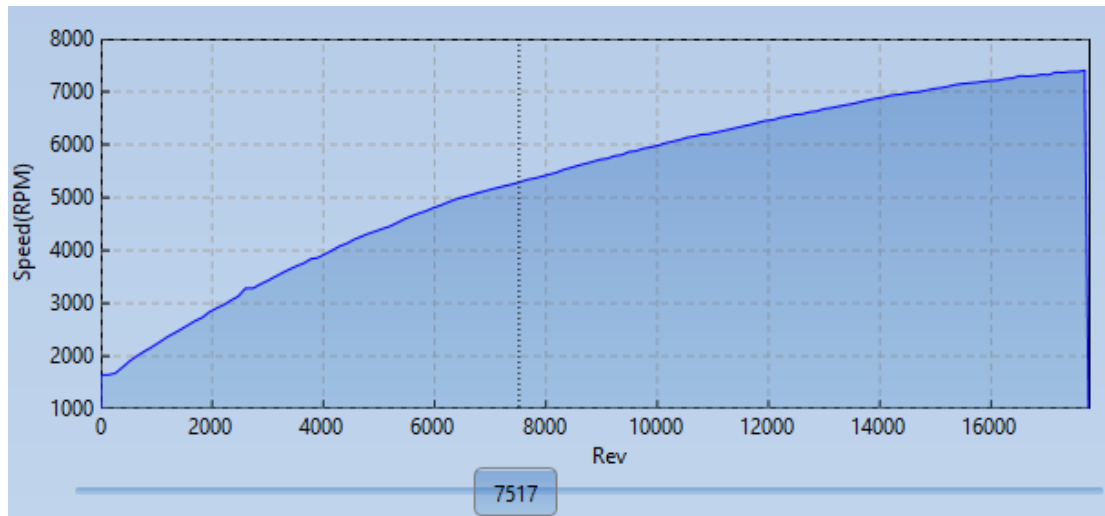


Figure 5 – OPR History Display

This display shows the speed history of the vehicle. The X axis is recorded revolutions which is effectively time. The Y Axis is in speed in Revolutions per Minute (RPM). The cursor underneath the display can be used to move the replay to a specific point in the file. For example if an event happened at a certain time. The current revolution number is shown on the cursor handle. A Ctrl Click on the graph will move the cursor to the point where the mouse was clicked.

This display can be used as a stimulus for other operations such as cropping a data set or exporting a zeroed file. See those sections for more detail.



The display can be zoomed, and re-zoomed, with the left mouse button. To reset the display use the reset button on the bottom right of the display.



The display can be detached in order to make it easier to view and manipulate the data. Pressing this button will pop out the display into a new container. To put it back again close the new display.

2.4.2. Speed Display (B)

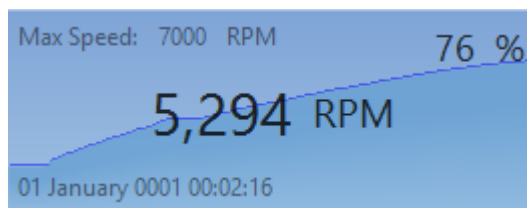


Figure 6 –Speed composite display.

The speed display is a composite of several different items. The main display is the current speed in RPM. The graph in the background is a history of the speed with a

full scale equal to the configurations max speed entry. The maximum speed entry is also displayed in the top left corner. The current speed as a percentage of max speed is displayed in the top right corner. The absolute time index of the file is displayed in the bottom left of the display. This is only absolute if the data was recorded with MultiTool and hence a start timestamp is present. If MultiTool does not find this time it will revert to 1st Jan 0001. Details of how to insert a start timestamp can be found in the Editor Manual.

2.4.3. User Logging Panel (C)

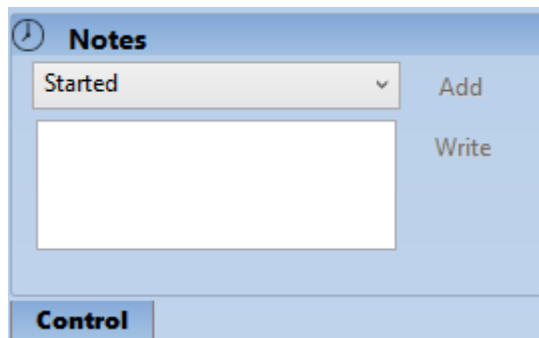
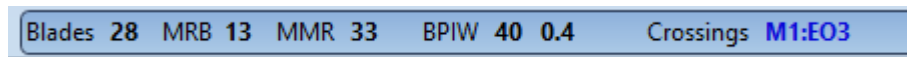


Figure 7 – User Logging Panel

User comments entered in the Acquisition system can be viewed here. The comments may refer to an event or a time or a deviation from a scheduled manoeuvre. Refer to the Acquisition Manual for more information.

2.4.4. Info Bar



The info bar shows parameters and calculated values which can indicate both the quality of the data being taken and what that data might contain.

Blades: The number of blades as defined by the configuration.

MRB: The most responding blade out of all of the blades. This measure is taken from asynchronous information and may not be accurate for a pure synchronous mode at constant speed.

MMR: The max to min ratio is the ratio of the MRB to the least responding blade. There is no correct or wrong value for this parameter but it should be noted when using the waterfall amplitude display as this is an all blade display so the amplitude shown will be an average value. With a high MMR it could indicate that some blades are responding at significantly higher levels.

BPIW: The first number is the average position of a blade for all probes when windowed against the OPR. This number should be fairly constant for a good setup and good data. If this value is jumping around then there is a problem in the setup.

The second number after BPIW is the standard deviation of the probe positions as calculated from the data. If the probe angles are correctly entered in the configuration and the probes are positioned correctly and connected correctly to the system this number will be fewer than 5. It is possible for blade vibrations such as stall to take this number over 5 but that will be evident from the waterfall display (D). With no large blade vibration if the number shown is over 5 it will turn red and this is an indicator that one of the following is incorrect and this should be rectified immediately.

- Probes are incorrect in the configuration.
- Probes are not fitted correctly or are loose.
- Probes have been connected in the wrong order to the hardware.

Mode and Engine Order Crossings

Blades	28	MRB	13	MMR	33	BPIW	40	0.4	Crossings	M1:E03
--------	----	-----	----	-----	----	------	----	-----	-----------	--------

When a configuration file is loaded in either Acquisition or Replay then the system will also look in the configuration folder for an analysis file. If more than one is present it will pick the first one. If none are found then the feature will be disabled. If it does find an analysis file it will load it and inform the user in the status area

13:05:31 Engine Order-Mode Crossing information will be available using 2468 Analysis1

Once the system has the analysis configuration information it will check the current speed against the first 20 engine orders and any defined modes. When a match is found it is displayed in the Info Bar after *Crossings* as shown above. This is useful when acquiring data as it notifies the user that one of their analysis crossings is currently active.

2.4.5. Waterfall Display (D)

The waterfall display is an all blade FFT display which scrolls in time from right to left. The newest data is displayed on the right side and then scrolls across to the left before disappearing. While data is visible on the display various parameters are tracked by the system to aid in calculations.

Tracking

Depending on the tracking preferences set out in section [Error! Reference source not found.](#) clicking on a response in the display will perform a track analysis. This will attempt to calculate the all blade frequency and amplitude of the response. Note that this is an all blade response so it will be an average value for frequency and amplitude. If the max to min blade response ratio is high then some blades may be vibrating as a significantly higher amplitude. Check this by referring to the MMR section as shown below.

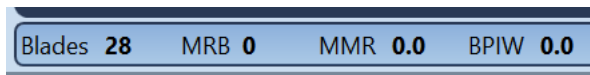


Figure 8 Max to Min responding blade ratio

2.4.6. Waterfall Options (H)

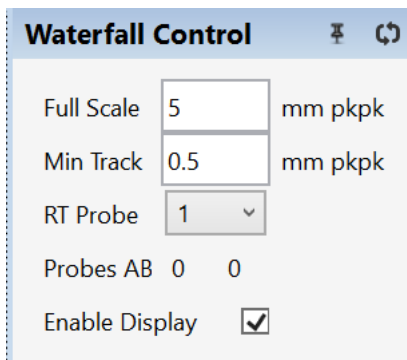


Figure 9 – Waterfall Options

Full Scale - Data at or above this value will be white on the graph.

Min Track - When a response is clicked on the software will track the response to the left selecting the maximum value found with a few bins until the amplitude of the data fall below this value and then the track will end.

RT Probe – The probe number (1-n) whose data is used for the display. If one probe is better than the rest then select this probe for display as it gives a cleaner picture. Disabling a probe will trigger a new probe to be selected if it was being used.

Probes AB – The software determines the best probes for calculation. The probes it uses are shown here and cannot be changed. This is for information only. Disabling a probe will update this display if it was being used.

2.4.7. Disabling Probes for Replay (F)

Displays such as the waterfall use data from several probes. If one of these probes is bad or noisy then this data may contaminate any calculations using that probe. For this reason probes may need to be disabled from being displayed but will still be recorded. If the application has automatically disabled a probe it can also be turned back on again unless the file is empty or so poor that the application will not allow this. To enable or disable a probe use the Probe Enables Expander shown below.

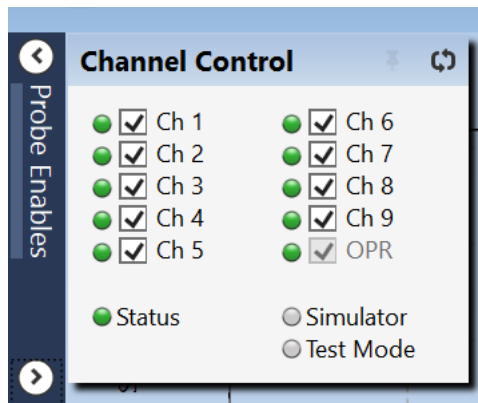


Figure 10 - Disabling Probes for Analysis

Probes that were not enabled in the configuration (because they don't exist) are greyed out and cannot be enabled. Configured probes can be enabled or disabled by checking or unchecking the probe in the display.

Depending on which algorithms are being used a minimum number of probes will be enforced by the application and it will not let you disable a probe if it breaks this rule. In this case you may need to re-enable a disabled probe first in order to disable a different probe.

2.4.8. Probe Status (G)

The probe status panel provides information on each probe. Channel 10 is always the Once Per Rev (OPR) channel.

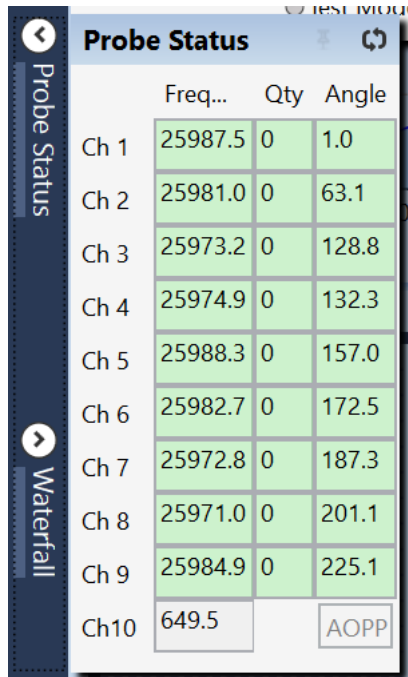
Blade passing frequency (Freq) – Is a gated sample probe frequency in Hz. This number should be the same for all probes. Noisy probes with surplus pulses will see a higher frequency and dirty probes missing blades will see a lower frequency. The blade passing frequency should be equal to the number of blades multiplied by the speed in Hz. If they are not then the relevant probe frequency will have a red background to indicate a possible problem.

Quality (Qty) - Positive numbers indicate that more pulses than blades were received during a revolution. This can indicate that too much laser power is being used

causing multiple reflections. Negative numbers indicate that not enough blade passing pulses were recorded in a revolution and more laser power may be required.

Probe Angle (Angle) – The calculated probe angle (degrees) from the data. This should agree with the angles entered into the configuration editor. If they do not this indicates a problem and the background of any affected probes will be red.

If there are problems and the panel is collapsed then the panel indicator itself will flash red.



	Freq...	Qty	Angle
Ch 1	25987.5	0	1.0
Ch 2	25981.0	0	63.1
Ch 3	25973.2	0	128.8
Ch 4	25974.9	0	132.3
Ch 5	25988.3	0	157.0
Ch 6	25982.7	0	172.5
Ch 7	25972.8	0	187.3
Ch 8	25971.0	0	201.1
Ch 9	25984.9	0	225.1
Ch10	649.5		AOPP

Figure 11 Probe Status

2.5.Tools

The Tools menu contains several useful tools for aiding in diagnostics or preparing data for further analysis.

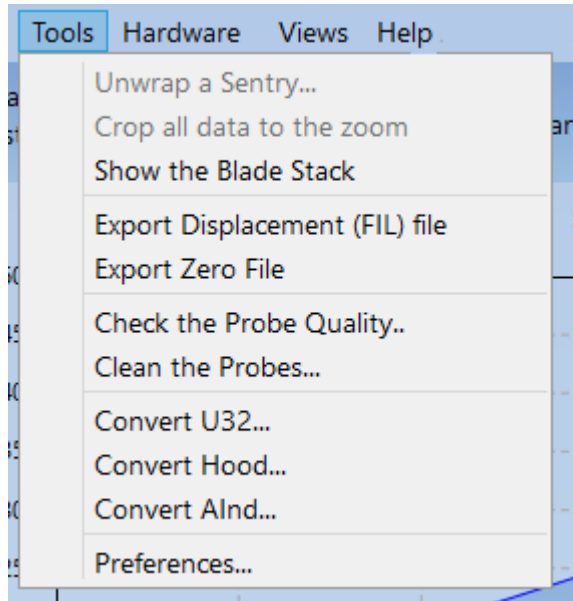
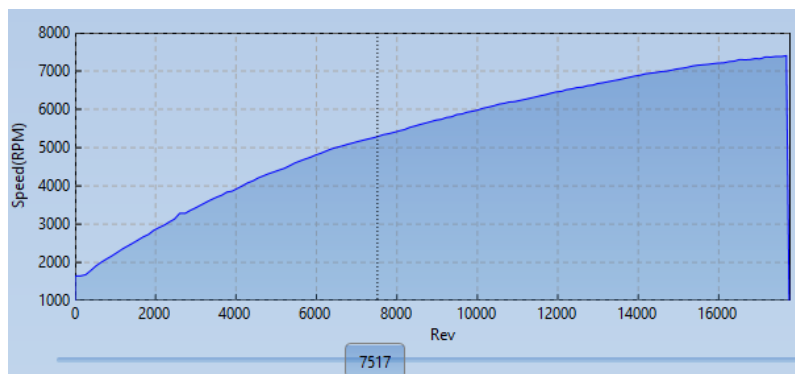


Figure 12 Tools Menu

2.5.1. Unwrap a Sentry

Refer to the acquisition system for more information. When the acquisition system is running and acquiring data, but is not logging, then the system writes a circular sentry file in the event that an unexpected event happens with the vehicle. Pressing the Sentry button in the acquisition will create a data log file as if the system had logged it normally. There is no need to do anything else as this file can be loaded into the Replay and Analysis tools. If the sentry button is not pressed and the acquisition stopped instead, then only the sentry files will exist. The Unwrap feature can take a sentry folder and create logged data files from it. Beware that the sentry is circular so older data will be overwritten by newer data while the system is acquiring.

2.5.2. Cropping Data to the Zoom



Using the speed display described in Figure 5 – OPR History Display data can be cropped based on the current X axis zoom range. The amplitude values are ignored so only the X range of the zoom will be used. The original dataset is not altered, instead a new sub directory is created with time and date containing the cropped dataset and a copy of the configuration files. This operation can be carried out as many times as necessary.

When Zoomed then the *Figure 12* will have the *Figure 12* menu item enabled. Click on this to perform the data crop.

2.5.3. Blade Stack Pattern

The blade stack pattern is the measured position of each blade for each probe. The display removes all vibration and offsets due to probe positions allowing each probe to be displayed against a common axis. Figure 13 - Good Blade Stack Patterns shows an example of a good pattern. All probes are showing the same or similar values for each blade. This gives confidence that no errors have been made in the configuration or setup of the test.

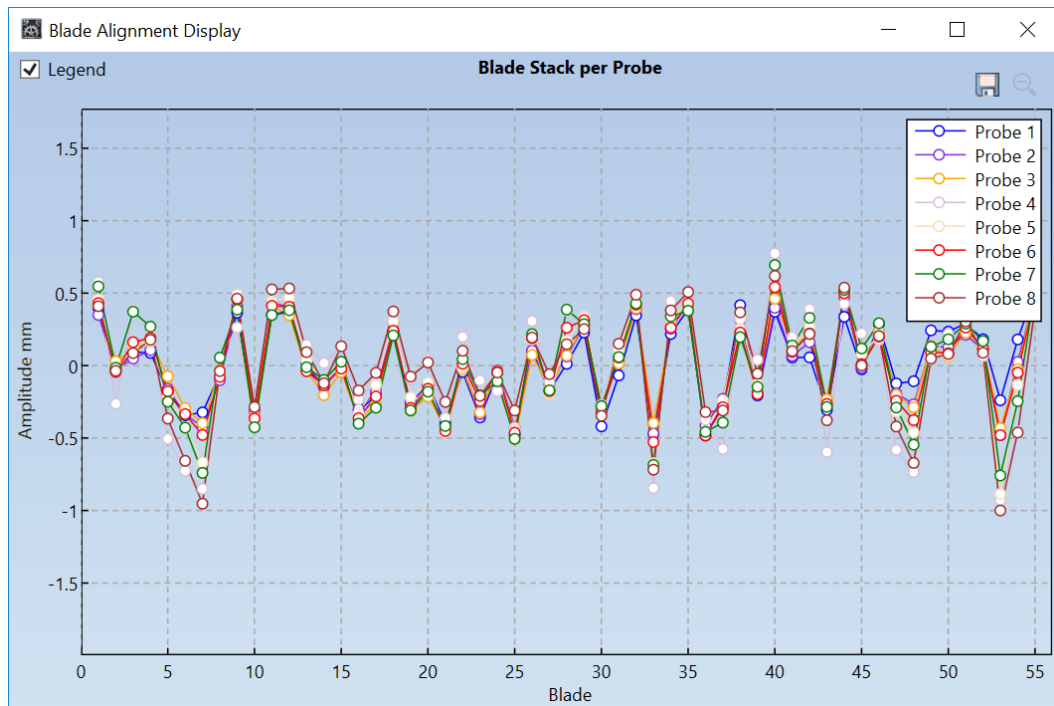


Figure 13 - Good Blade Stack Pattern Example

An example of a poor stack is shown in Figure 15 - Poor Blade Stack Example where none of the probes show the same pattern. This is indicative of either errors in the probe angles entered into the configuration editor or errors in connecting up the probes to the acquisition system.

When the file is loaded an indication of this error will be shown

Note: - **There is no point in proceeding or doing any analysis until this is resolved.**

Checking Recorded Data Quality.....

- Checking once per revolution data... ✓
 - Checking raw probe data... ✓
 - Checking probe quality... ✓
 - Checking blade pattern correlation... ✗
 - Checking probe positions... ✓
- This only needs to be done once per dataset.

Figure 14 - Checking Recorded Data Quality

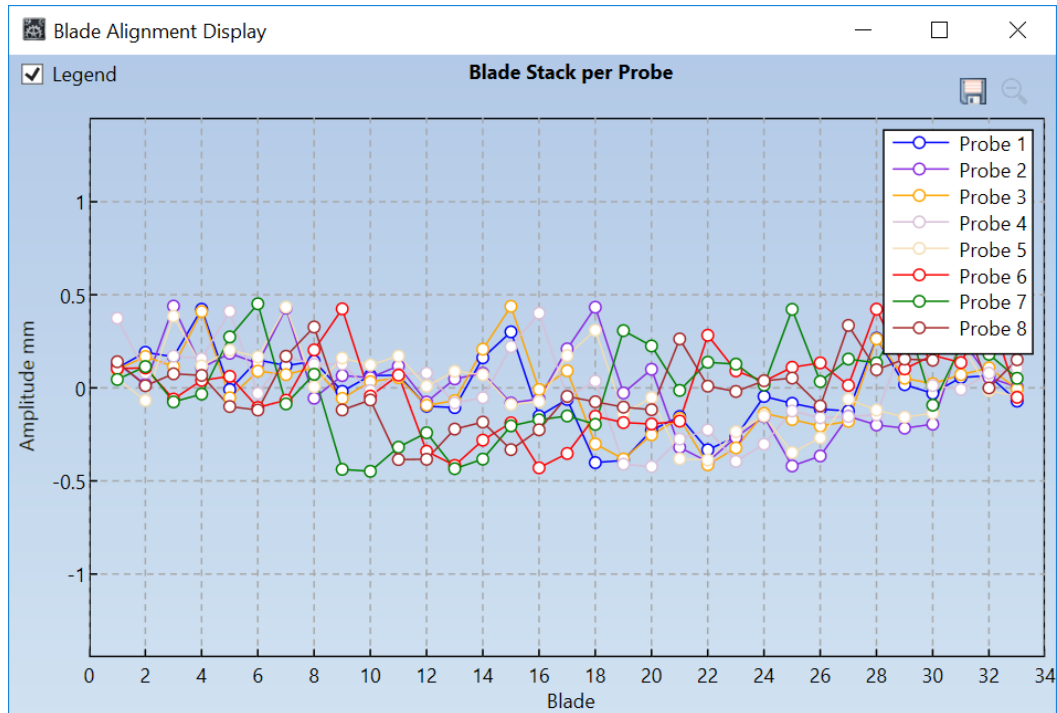


Figure 15 - Poor Blade Stack Example

2.5.4. Export a Displacement File

This feature may be greyed out as it is a separately licensed item. If you expect this function to be enabled, and it is not, then please contact support@emtd-measurement.com.

A displacement or FIL file is a file of displacement data for each probe and blade in Metres. Unlike the zeroed file the data has not been de-trended or filtered. The data has been sorted and converted to displacement ready for further analysis by either another package or for use in prototyping new algorithms. The output file type is a binary flat file with a .FIL extension.

The format of the file is as follows. Data is packed to the 4 byte boundary so some applications like PvWave should take this into account. For Matlab the default pack is also 4 byte aligned so nothing needs to be done.

File Header

The file header is 192 bytes long and consists of the following: Size in () is bytes

Header Length	(4)
Number of Probes	(4)
Number of Revolutions	(4)
Rotor Tip Radius LE	(8)
Rotor Tip Radius TE	(8)
Probe Angles	(80)
Probe Axial Position	(80)

Once Per Rev (OPR) period times

For each revolution of data a rev period will be written as a 4 byte Single (float). The total bytes written will be 4 * Number of Revs.

Blade Data

For each blade all probe data will be written as a 4 byte Single (float).

[Blade 1 Probe 1 Revs1-N]

[Blade 1 Probe 2 Revs1-N]

.....

[Blade 1 Probe N Revs1-N]

[Blade 2 Probe 1 Revs1-N]

2.5.5. Export a Zeroed File

This feature may be greyed out as it is a separately licensed item. If you expect this function to be enabled, and it is not, then please contact support@emtd-measurement.com.

A zeroed file is a file of displacement data for each probe and blade in mm. The data has been de-trended ready for further analysis by either another package or for use in prototyping new algorithms. If the selected output was CSV then the output file type is a comma separated variable (CSV) file.

If the selected output was BIN then the output file type is a flat binary file (binary).

The format of the file is as follows. Data is packed to the 4 byte boundary so some applications like PvWave should take this into account. For Matlab the default pack is also 4 byte aligned so nothing needs to be done.

File Header

The file header is 144 bytes long and consists of the following: Size in () is bytes

Header Length	(4)
Number of Revolutions	(4)
Number of Probes	(4)
Number of Blades	(4)
Start Rev Number	(4)
Stop Rev Number	(4)
Rotor Tip Radius LE	(8)
Rotor Tip Radius TE	(8)
Exported – Year	(4)
Exported – Month	(4)
Exported – Day	(4)
Exported – Hour	(4)
Exported – Minute	(4)
Exported – Second	(4)
Probe Angles	(80)

Once Per Rev (OPR) period times

For each revolution of data a rev period will be written as a 4 byte Single (float). The total bytes written will be 4 * Number of Revs.

Blade Data

For each blade all probe data will be written as a 4 byte Single (float).

[Blade 1 Probe 1 Revs1-N]

[Blade 1 Probe 2 Revs1-N]

.....

[Blade 1 Probe N Revs1-N]

[Blade 2 Probe 1 Revs1-N]

2.5.6. Check Probe Quality

If error messages are being shown during loading a dataset then it may be useful to have more information about a particular probe file. Selecting this option allows the user to navigate and select one or more probe files. The files are then checked for lost and surplus pulses and the results displayed in the output tab at the bottom. Files are not altered.

2.5.7. Clean the Probes

This does the same as checking the probe quality and also operates on one or more probe files but the files are cleaned and overwritten.

Note: - Please backup the dataset first as this operation cannot be undone.

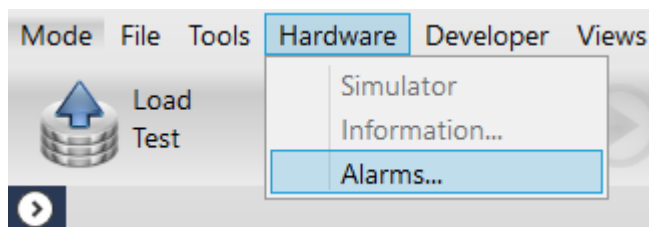
2.6. Alarms

MultiTool supports software and hardware alarms in both Acquisition and Replay modes. The Replay implementation has some limitations and is there purely for testing and limited replaying of events. Note that as the Replay mode does not have a blade stack display, these alarms cannot be tested.

The alarms are stored in a file called Alarms.xml. This is located in the configuration root folder for acquisition mode and in the individual data directory for replay mode. When logging data in acquisition this file is copied over to the data directory automatically.

Note. If you edit the alarms in replay mode and then want to use it in acquisition mode then you must copy the file from the replay directory and overwrite the root alarm file in the configuration folder. This can then be checked by running the Alarm Manager from the Acquisition Mode with the configuration file loaded.

The Alarm Editor is identical in either case so here we will use the Acquisition mode. The Alarm Editor is accessed via the Hardware menu shown below. This menu is only enabled when a configuration is loaded. For Acquisition hardware you do not need to configure the hardware in order to edit the alarms, just a loaded configuration.



The Alarm Editor will initially be empty unless some alarms were previously added.

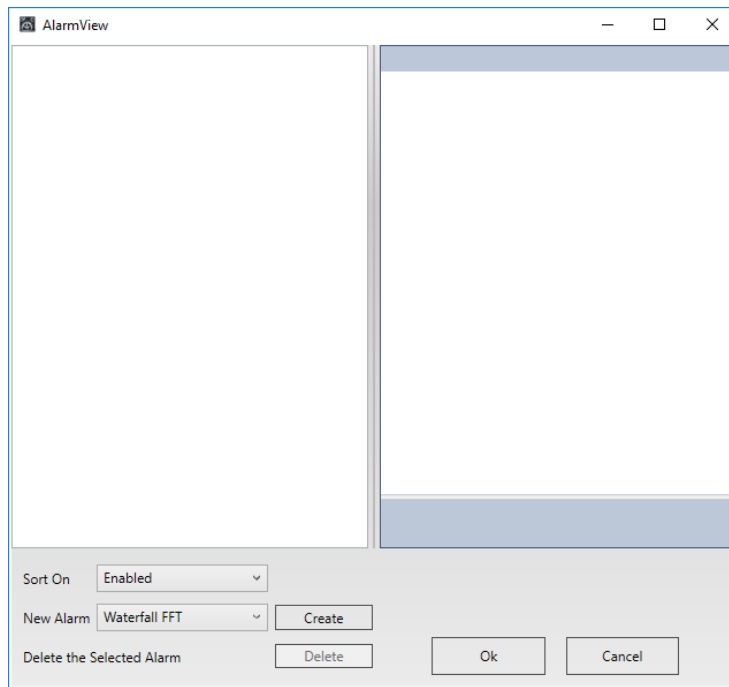


Figure 16 The Alarm Editor Window

To add an alarm select the new alarm type and click Create. Below we have added a Waterfall alarm and a Speed alarm. The Alarm Editor is split into two halves, a list of alarms is on the left and the individual alarms properties of the selected alarm are shown on the right.

Different alarm types have different properties but the Alarm section and the first two of the Settings section are common to all alarms. To get help on an individual alarm property simply select the alarm and then select the property as shown below. A description of the property will be shown at the bottom of the property page. In this case it is the help for the alarm warning level.

See Appendix 1 for a list of the properties.

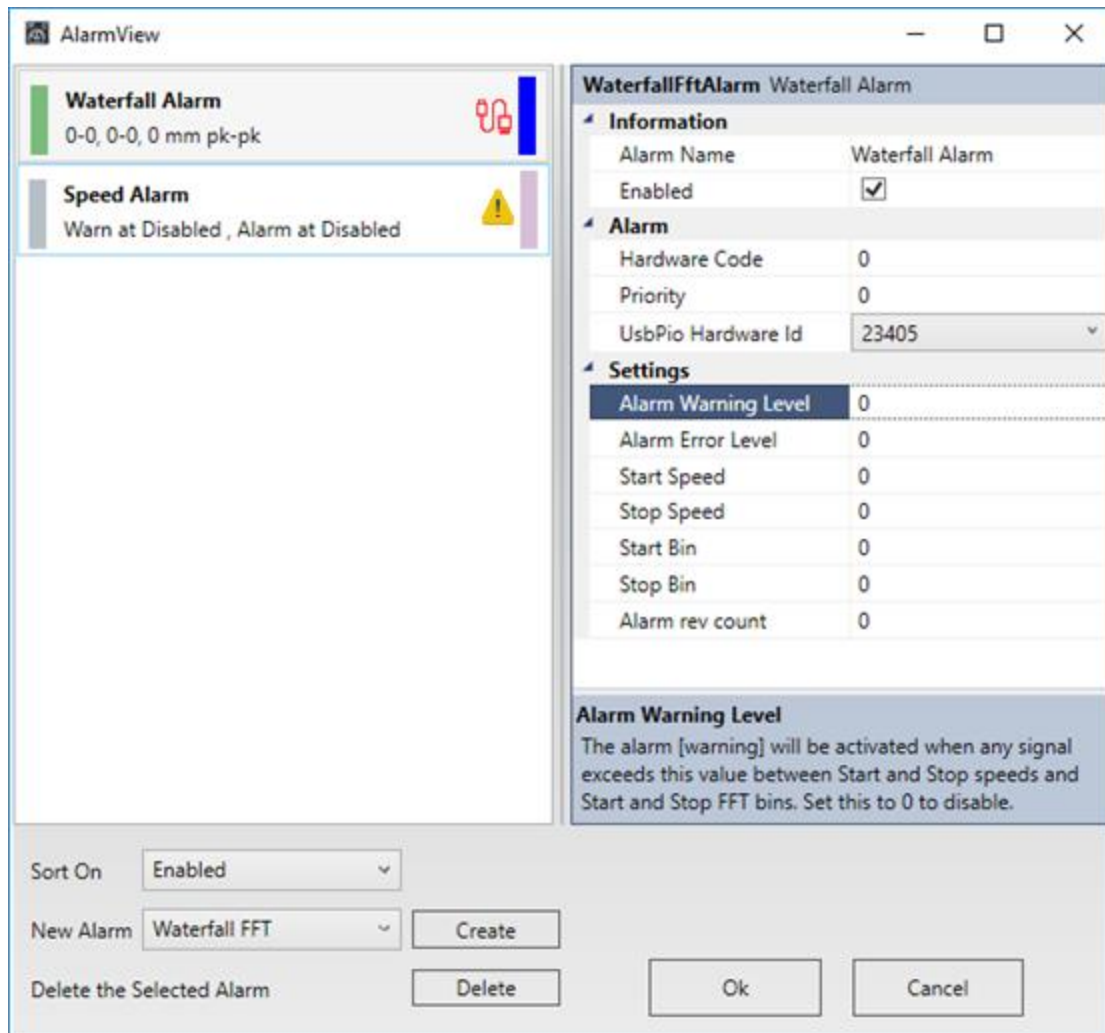


Figure 17 Alarm Properties

Visually the alarms are colour coded on the left and right hand sides. On the left an enabled alarm will be green while a disabled alarm will be grey. The right hand colour is to help differentiate between different alarm types but you can also sort the list on type (see below).



An alarm that will be routed to the alarm hardware has the red hardware icon shown on the right hand side. This hardware is specified in the *UsbPio Hardware Id* field in the individual alarm properties window. See below for more information on Hardware Alarms.



An enabled alarm that has no limits set and therefore no functionality will have a warning icon next to it as shown above. If this configuration is loaded then a further warning will be displayed in the status messages.

2.6.1. Alarm Properties

All alarms share some common properties which are under the headings *Information* and *Alarm*. Information defines the alarm type (which can't be changed) and whether or not the alarm is enabled. The Alarm section deals with the hardware so please refer to the [2.6.2](#) for more information.

Multiple alarms can be selected at the same time, in the alarm list which allows for the editing of common properties. This allows the setting of a common feature on multiple alarms in one go.

The Settings section is where the different types of alarms will expose their properties. In the example shown in Figure 17 Alarm Properties a Waterfall Alarm is shown. For information on what each property represents help will be displayed at the bottom of the property viewer when the property is highlighted. In this case the Alarm Warning Level.

Most Alarms have an Alarm and a Warning Level. Needless to say, the Alarm Level should be greater than the warning level. If it is not then a warning will be given. If a warning is not required then setting the Warning property to 0 will disable just that property. Again, see the individual help text for more information. When all of the conditions have been met for the alarm then an alarm will be triggered. Software only alarms will display a message in red text in the InfoBar. Hardware alarms will also display this message but will output the alarm to the specified device. The message will be shown as long as the alarm conditions are met.

If more than one alarm occurs at the same time then the system will check the given priority of the alarm and output the highest priority alarm. The priority of the alarm can be set by assigning a non-zero number in the priority property under the Alarm heading. The highest priority available is 255. As the system supports up to two hardware alarm devices then multiple hardware alarms can be output at the same time.

2.6.1.1. Waterfall Alarm

The [2.4.5](#) shows an FFT slice derived from all of the blades. The display scrolls from right to left allowing a history plot for a single probe. Any asynchronous activity will be represented by a colour change in the vertical slice. For the Waterfall alarm it is possible to alarm on the amplitude (colour) of the FFT bin with and without constraining conditions. For more information on individual properties simply highlight them and review the help text.

If the alarm needs to be constrained to a range of bins then the operator needs to know the bin number and therefore it is possible to display the current FFT bin number on the waterfall display. In Replay or Acquisition modes holding the SHIFT key while the mouse is over the waterfall will display the bin under the mouse in the top right corner of the chart. For example a waterfall alarm may be set to alarm if

any amplitude exceeds a level of X mm pk-pk. It could also constrain that further by limiting it to bins 150-160 while between speeds of 6000 and 7000 RPM and the amplitude must have been over the alarm value for 50 successive revolutions. Each of these constraints can be disabled, again see the individual property help text.

2.6.2. Hardware Alarms

EMTD can supply, if requested, hardware alarm modules. These modules are USB Digital IO devices supplied by BMCM. The datasheet for these devices is supplied along with the drivers and the devices when ordered from EMTD. It can also be supplied on request to enquiries@emtd-measurement.com.



Each of these USB devices has a unique serial number printed on a label and this is the number which can be selected in the alarm editor.

The device itself consists of three 8 bit digital ports A through C, which output on a 25 way female D type connector. An example of a mating part from RS components is RS stock number 437-336. Each bit on the eight bit port is a 5V output capable of delivering 1mA. MultiTool has configured these as follows.

A0 [Pin 1] – Alarm. This output will go high whenever an alarm that has this particular hardware device specified, has been triggered at an alarm level.

A1 [Pin 2] – Warning. This output will go high whenever an alarm that has this particular hardware device specified, has been triggered at a warning level.

B0-B7 [Pin 5, 18, 6, 19, 7, 20, 8, 21] – Hardware Code

This is the 8 bit code that can be assigned to an alarm through the Hardware Code property in the alarm editor. This allows a connected device to know which of the alarms has been triggered.

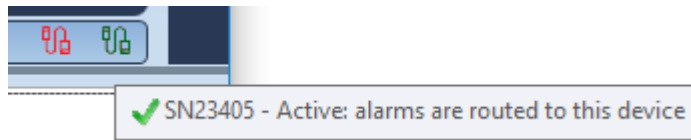
C0 [Pin 1] – Heartbeat. This output will pulse at 1Hz intervals whenever the system is active. Any connected system should monitor this pulse to be certain that the alarm system is running.

MultiTool displays the state of the alarm hardware on the right hand side of the InfoBar via two icons. For more information on the Information Bar see the section titled 2.4.4.

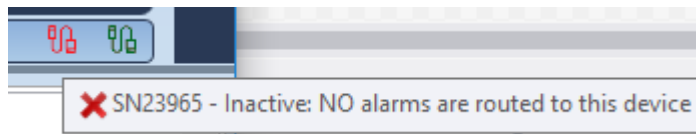
When a configuration is loaded MultiTool looks for the Alarms.xml file and if present will also load the alarms. It then scans for any connected USB hardware and compares the id's of the hardware with those defined, if any, in the alarm file. Each of these USB devices has a unique serial number printed on a label and this is the number which can be selected in the alarm editor.

If no hardware is detected then the two icons remain greyed.

If a device is located and at least one alarm references it then the icon will turn green.



If a device is located but no alarms reference it then the icon will turn red as a warning.



For diagnostics and testing EMTD also supplies a visualizer for the alarms which can be plugged into the alarm hardware. All three ports have an LED on each bit making it easy to see what individual outputs are doing.



3. OPR Creation post testing

For information about setting the system up to generate an OPR internally please refer to the Editor manual.

The EMTD BTT system is able to derive an OPR signal in the case where the main OPR has failed or one is not available. EMTD strongly suggests that when planning a test that provision is made for an OPR signal to the system. In challenging environments where some data loss is inevitable an OPR signal can make analysis much easier for some of the more complex analysis methods. Where an OPR is not available there is the choice to derive an OPR from the probe signals either in the hardware or in the software.

Deriving an OPR can create problems. This being that the start-up is random meaning that 'blade 1' changes from run to run. Secondly the order may change during data collection so that 'blade 1' shuffles due to lost and surplus signals. For real time acquisition this is not usually a problem for the monitoring of displacements, however during analysis the blade order may change invalidating any per blade analysis performed.

For this reason we recommend that a second software derived OPR is generated after the test and used for the analysis of data. This allows MultiTool to correct for errors as it has access to all the data. Multitool will also maintain the position of blade 1 across all manoeuvres for analysis purposes. Note that the data must be of a good quality for this method to work. The tool will inform the user of any failures.

This ability is only available in MultiTool Replay mode.

3.1. Creating the OPR and blade matching.

Note that this process will permanently change the OPR file. Keep a backup!

We always advise keeping a raw copy of recorded data separate from the working data used for analysis. This way any mistakes can be rectified by overwriting the analysis data from the backup.

- From windows explorer navigate to the recorded data for the test.
- Search for all occurrences of the file Checked.xml and delete them.
- Search for all occurrences of the file MasterStack.csv and delete them.

If the data has been recorded with a software derived OPR then skip this step. If not, all occurrences of the configuration file (there is a copy with each recorded dataset) need to be set as software derived OPR. In MultiTool switch to Editor Mode and load the configuration file from the root of the recorded data folder. In the

probes tab set the OPR to derived and select software. Then save the configuration and overwrite all copies of it from the Test's logged data folder and below.

We have now prepared the system for matching blade one and aligning the stack across the recorded data.

NOTE. If you do this next bit wrong you will have to start again.

- In replay. Load the data you want to generate the Master Stack from. It is important to pick the best data possible as this will generate the template for the system to use.

This creates a file, MasterStack.csv in the root of the **DAYS folder**, not the test root as you may change things days to day.

Check the stack is good from Tools → Show the blade stack. If all is good then we have created the template successfully.

- If you want all of the test data to be set to this template then the MasterStack.csv file must be copied to the root of each day's testing. The same place as the created original but for other days.
- Load each dataset in Replay and check for any error messages. If no errors are shown then the system has adjusted the data to match the template. This can be confirmed by looking at the stack. Tools → Show the blade stack

Each dataset needs to be loaded in turn. Once all of the data has been loaded then the blade stack will be consistent across all test data.