Dragon
vision

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Legal

DragonVision™ is a product of Optical Vibration S de RL de CV Please review the DragonVision terms and conditions and licensing agreement located at https://www.optical-vibration.com/terms-conditions/

By Installing or using DragonVision the user agrees to abide by the aforementioned terms and conditions and licensing agreement.

About

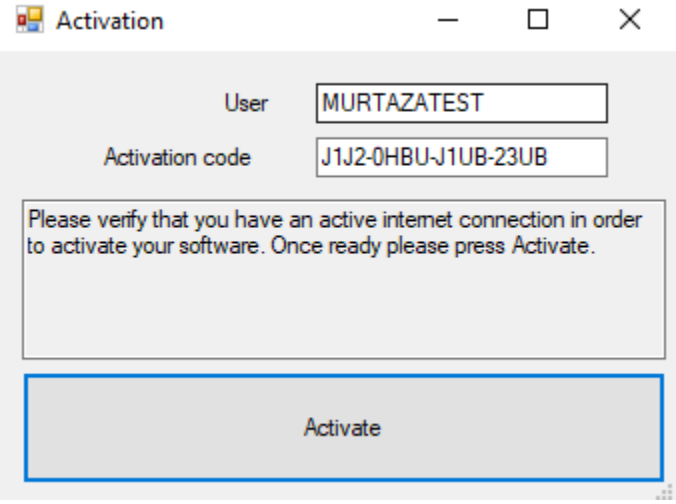
DragonVision™ Video Deflection Technology is Vibration Analysis software that tracks very small movements within ordinary video recordings. Through complex algorithms, DragonVision™ compares each one of the frames of the video looking for microscopic movements of specific points. Later, it subsequently converts the results into vibration signals. In fact, DragonVision™ can detect thousands of vibration points in a single video. Thus, making it an ideal tool for various types of vibration analysis that would otherwise take a long time to complete.

Getting Started

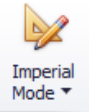
DragonVision is a software only application. Recordings analyzed within DragonVision can be taken with any video recording device available. The higher the resolution, the higher the frame rate, the better the results.

Installation

For Microsoft Windows, Download and Run the Installation File. Upon Completion of the Installation upon first use of the software enter the User ID and Activation Code provided to you upon purchasing the software.



Settings



Within the **Help** menu select either Imperial or Metric Mode.

Recording Videos

DragonVision allows the user to import and analyze video from any source. Be sure to know the frame rate of the camera being used as it will be required to provide accurate analysis of the video within the software.

iPhone 10 and above can record in slow motion mode at HD resolution with a sample/frame rate of 240 frames per second.

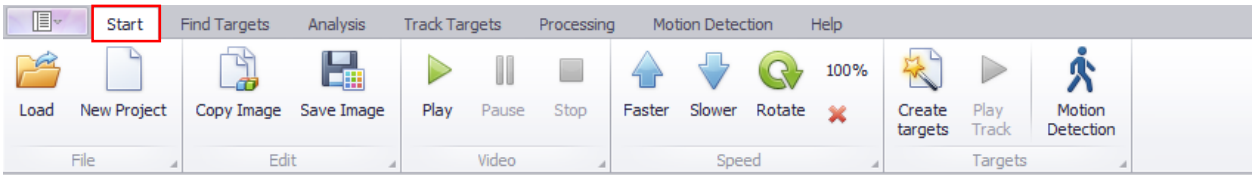
Similarly, other cameras available can record much higher frame rates.

Understanding Maximum Frequency

Calculating fMax is important as the recorded frame rate directly corresponds to the maximum frequency.

> Example: 240fps * 60 = 14400 / 2 = 7200rpm fMax (if the recording was taken using 240fps sample rate)

Menu Bar - Start



Load: Allows the user to load any video file supported by DragonVision. DragonVision supports most all common video file formats.

New Project: Once a video is loaded this option allows the user to create a new project for analysis without having to close any preexisting work. This allows the user to have a number of different projects using the same video without having to reload the video or restart the software.

Copy Image: Allows the user to Copy any image in the video playback frame to the clipboard for use later.

Save Image: Allows the user to Save any image in the video playback frame to a selected directory on the device.

Play: Plays whatever video file processed or unprocessed that is in the video playback frame

Pause: Pauses whatever video file processed or unprocessed that is in the video playback frame

Stop: Stops whatever video file processed or unprocessed that is in the video playback frame

Faster: Speeds up the playback of a video file processed or unprocessed that is in the video playback frame

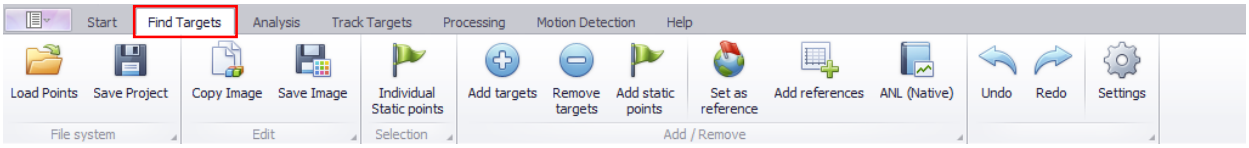
Slower: Slows down the playback of a video file processed or unprocessed that is in the video playback frame

Rotate: Allows the user to rotate the video within the software. This is often helpful if a video being imported is not oriented as the user would like

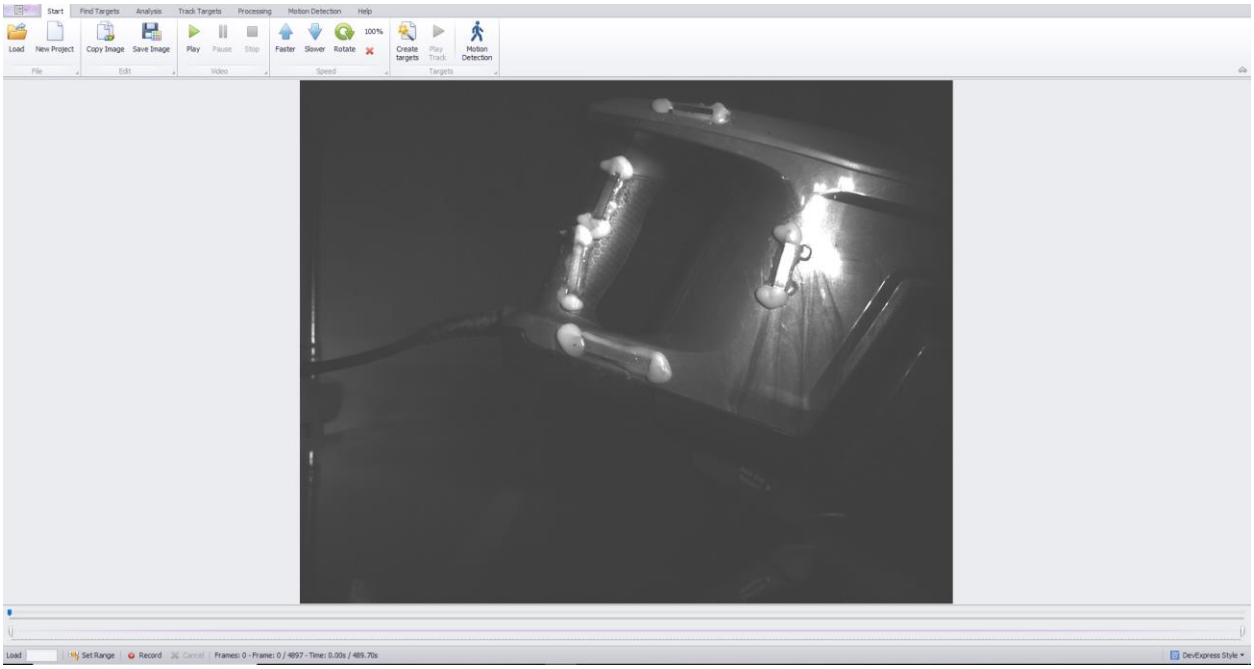
Create Targets: Identifies targets based upon the user defined quality settings found in **Find Targets – Settings**

Motion Detection: Creates a colorized or grayscale side by side model to visualize the displacement based upon color/shade

Menu Bar – Find Targets



Upon Loading a Video to DragonVision for analysis the video will display within the Video Play Back Frame.



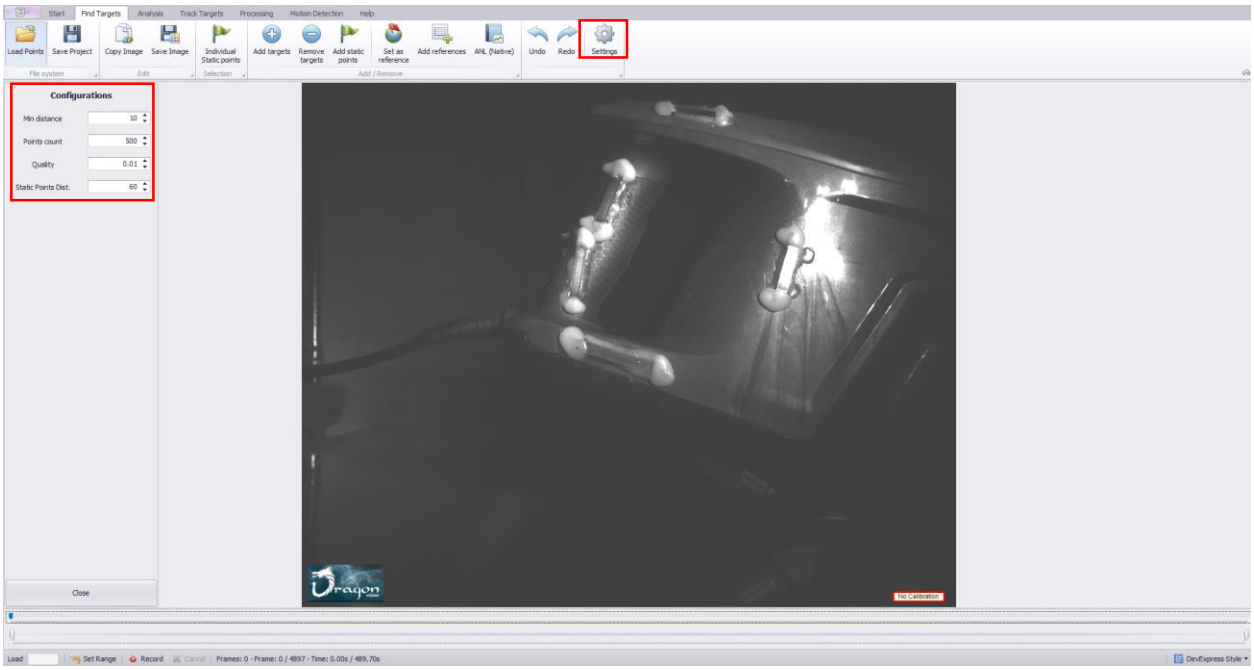
First the user must select the appropriate **settings** and then selecting the appropriate configurations for the DragonVision project based upon the users intended analysis method and desired results.

Min Distance: Is the minimum distance between targets

Points Count: Is the maximum number of points the target identification algorithm will attempt to identify

Quality: Is the resolution…the more decimal points the higher the analysis. Never use more than 3 decimal points.

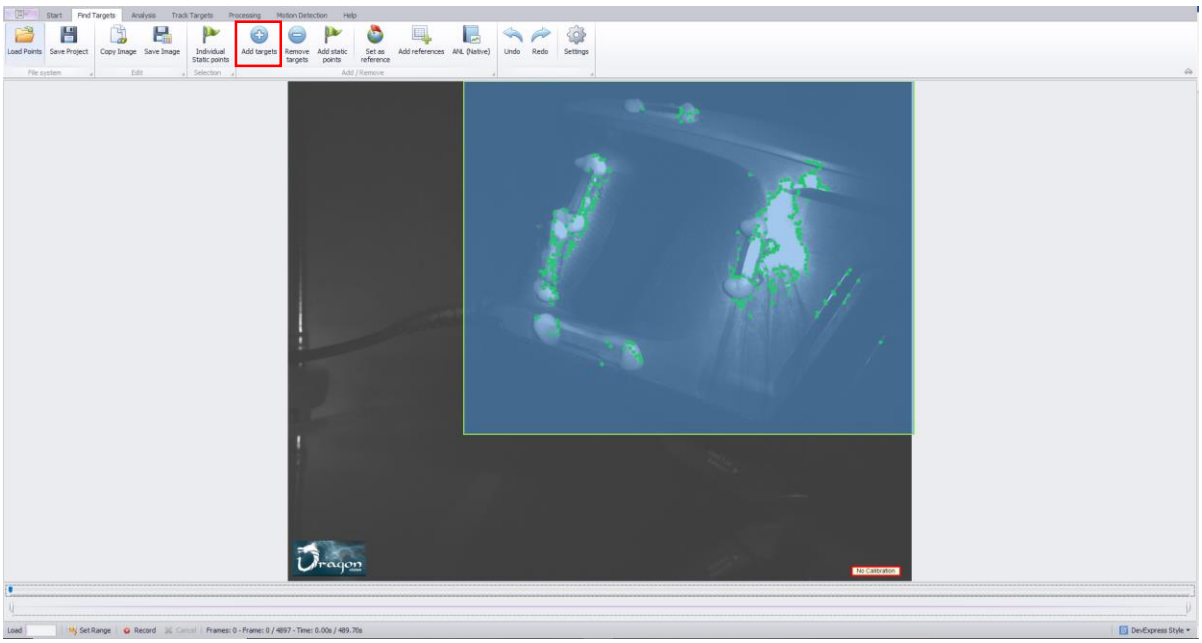
Static Points Dist.: Is the minimum distance between static points the algorithm will identify



Once the appropriate settings have been selected click **Close** to save and begin the project.

Step 1: Find Targets

DragonVision uses a proprietary algorithm to identify targets with the selected starting frame based on changes in angle and color. Targets may be identified based upon the entire frame within the Video Playback Frame or within a selected area within the frame based upon left clicking and drawing a box with the mouse and then selecting **Add targets** think of targets as each being a bi-axial sensor moving in the X and Y axis.

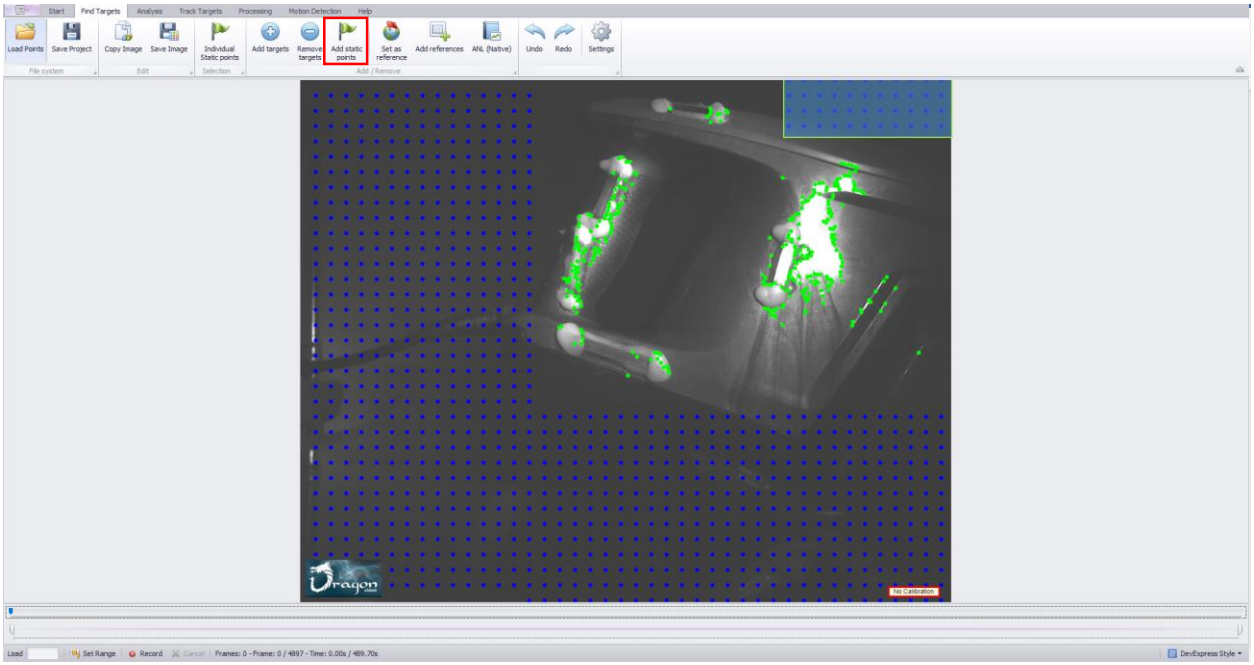


Allows the user to save progress at any time and come back to the project at a later date/time without having to restart the project from the beginning. Save project creates an .EIP file.

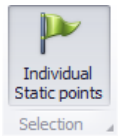
Allows the user to undo any previous action or redo an action that was undone like adding targets.

Step 2: Adding Static Points

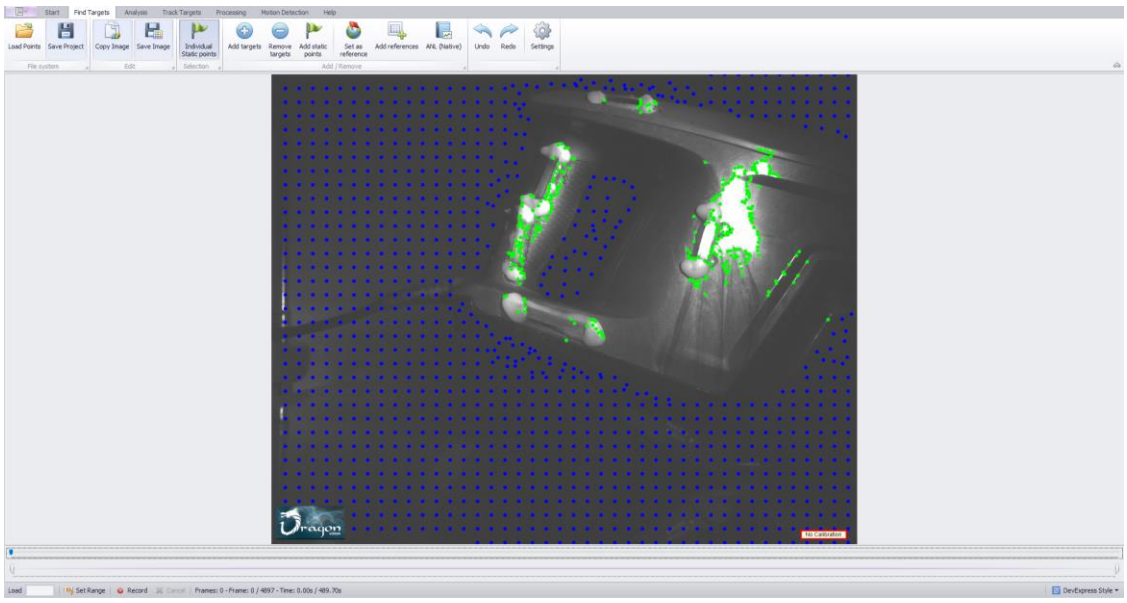
Select by left clicking and drawing a box within the Video Playback Frame areas in which you want to add static points (areas that are not of interest for movement) and select **Add static points.**



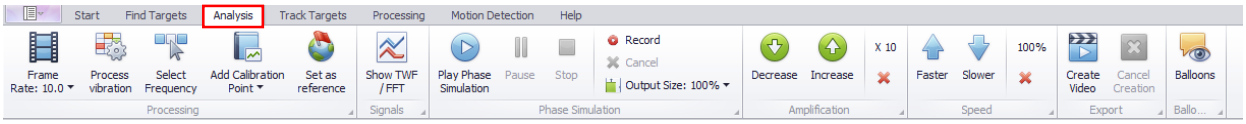
NOTE: Any static or target points may be deleted by simply left clicking and highlighting the area and pressing the delete key.

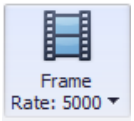


Once the majority of static points have been identified then select **Individual Static points** and left click within the video playback frame to further refine the static area.



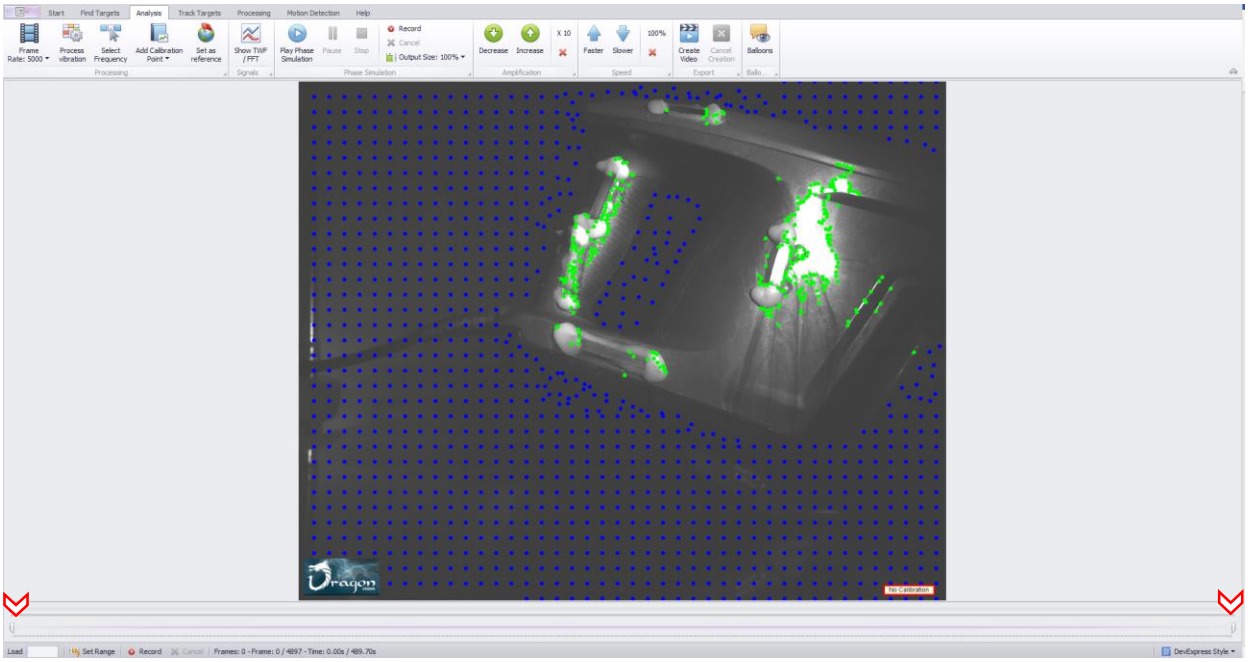
Step 3: Analysis Menu

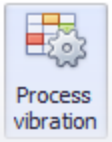




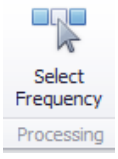
1. Select or enter the frame rate of the recording loaded to DragonVision.

NOTE: If you need to adjust the starting or ending point of the video for analysis for any reason use the cropping slider in the footer of the program.



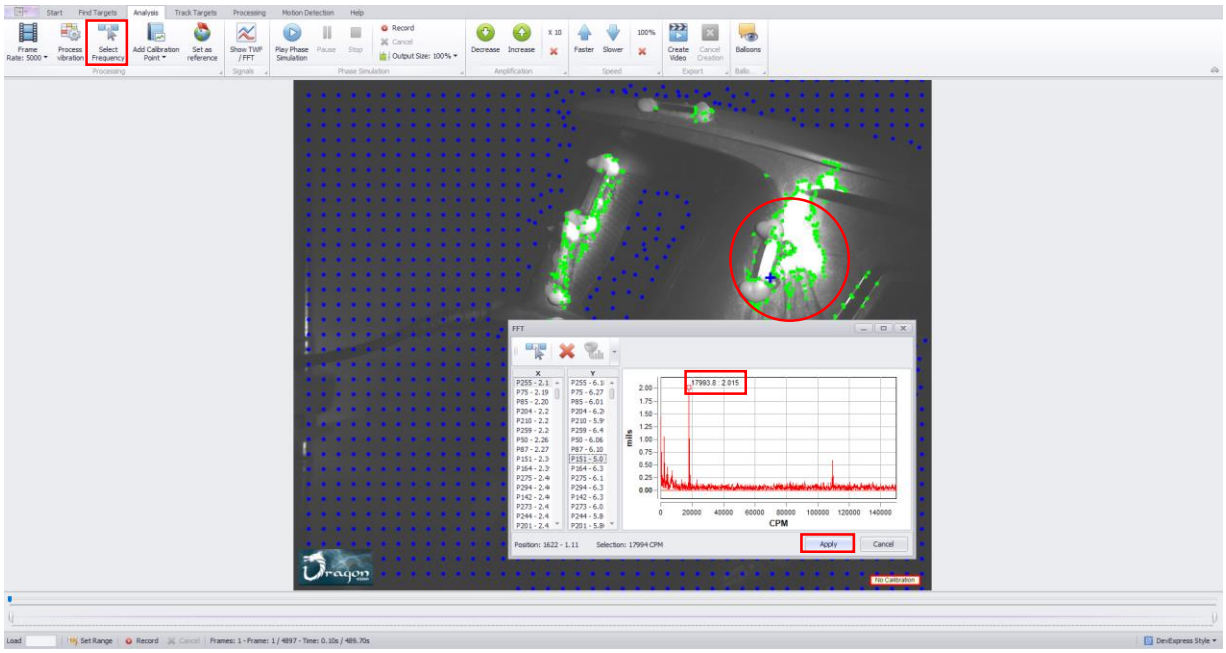


2. Once the frame rate and start/stop position of the video to be analyzed has been set, select **Process vibration.** DragonVision will indicate the processing progress in the bottom footer menu.

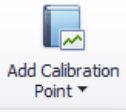


3. Upon successful completion of processing click **Select Frequency.** A pop-up window will display and the user will be prompted to review all targets and their applicable x/y FFT plots. Select the dominant peak of interest by left click within the plot and then selecting **Apply.**

Note: A crosshair target will indicate in the Video Playback Frame which target is currently being selected in the FFT window.



Step 4: Calibration



DragonVision allows the user to select from 3 different calibration methods.

ANL Method

While taking the video recording the user can record a vibration signature using any ERBESSD INSTRUMENTS data collector using either DigivibeMX or the WiSER Vibe App on the iOS store. This recording is saved in either plaform as an .ANL file and the user can select or highlight an area within the Video Playback Frame to identify where the sensor was placed that collected the ANL file and then import the ANL info DragonVision for a full FFT calibration (the most accurate calibration method).

PLEASE NOTE ERBESSD INSTRUMENTS® is in no-way affiliated with Optical Vibration S de RL de CV

Anti-Aliasing Filter

DragonVision™ incorporates an anti-aliasing filter developed by Optical Vibration that uses cross-channel comparison. In this way, nonexistent frequencies produced by the Aliasing phenomenon due to the low sampling rate of video cameras are eliminated from the FFT.

For more information on the “Aliasing” effect visit: https://en.wikipedia.org/wiki/Aliasing

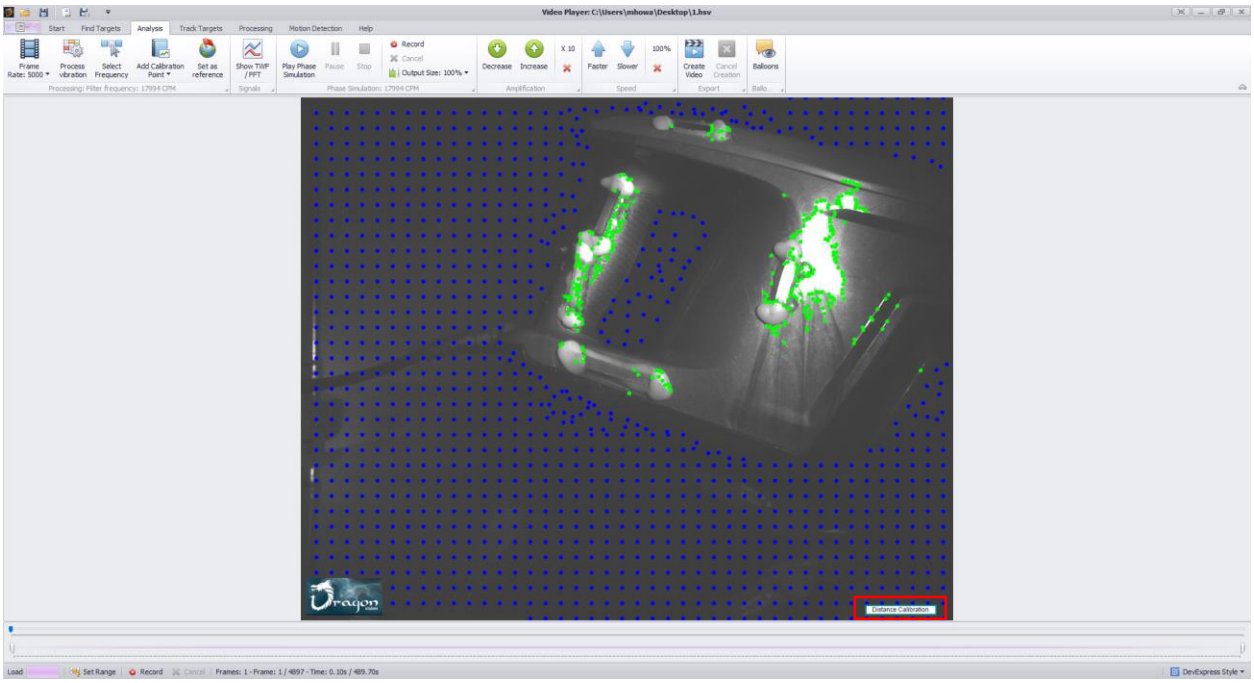
RMS Value

This method allows the user to select an area within the Video Playback Frame using the mouse to identify a location where the user placed another vibration analyzers sensor during the video recording and subsequently enter x/y displacement values. This method does not take frequency into consideration for calibration purposes and thus is not as accurate as the ANL method.

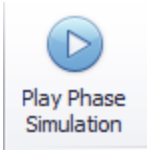
Distance

Allows the user to select a distance between two points with the Video Playback Frame and enter the distance between the two points. This is the least accurate calibration method.

NOTE: the calibration method selected and completed can be changed at any time and will be displayed in the bottom right of the DragonVision Video Playback Frame.

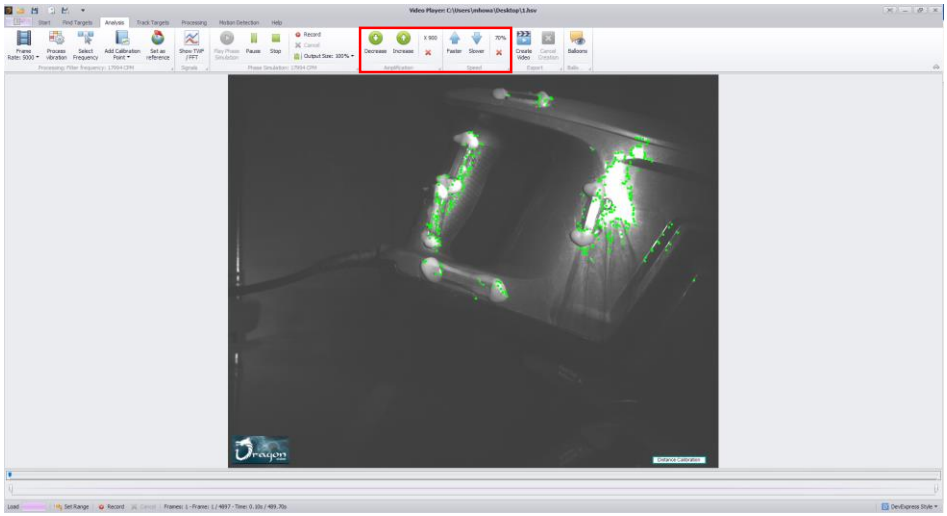

Video Player: C:\Users\mhowa\Desktop\1.hsv
Start
Find Targets
Analysis
Track Targets
Processing
Motion Detection
Help
Frame Rate: 5000
Process vibration
Select Frequency
Add Calibration Point
Set as reference
Show TWP / FFT
Play Phase Simulation
Pause
Stop
Record
Cancel
Output Size: 100%
Decrease
Increase
X 10
Faster
Slower
100%
Create Video
Cancel Creation
Balloons
Distance Calibration
Load
Set Range
Record
Cancel
Frames: 1 - Frame: 1 / 4897 - Time: 0.10s / 489.70s
DevExpress Style

Step 5: Phase Animation



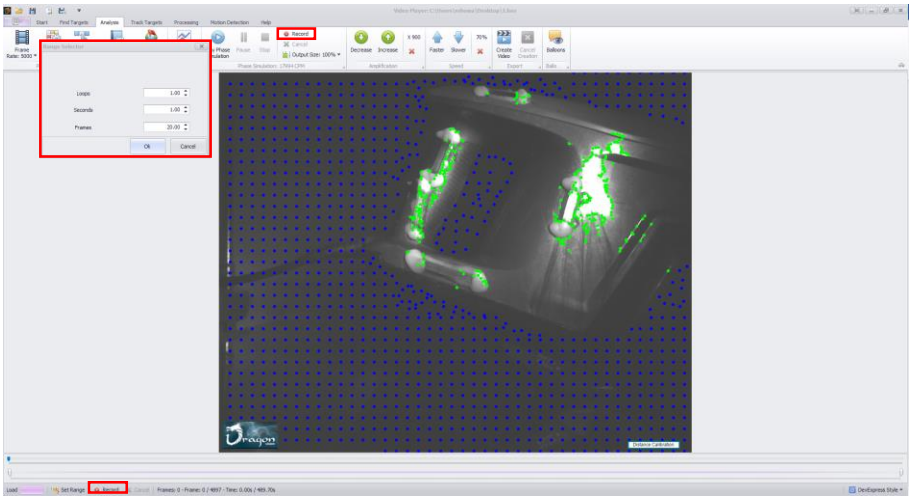
To visualize the target behavior throughout the processed Video Frames select **Play Phase Simulation.** This tool allows the user to quickly visualize target movement.

NOTE: Increase or Decrease Amplification and Speed as needed to achieve the desired results.



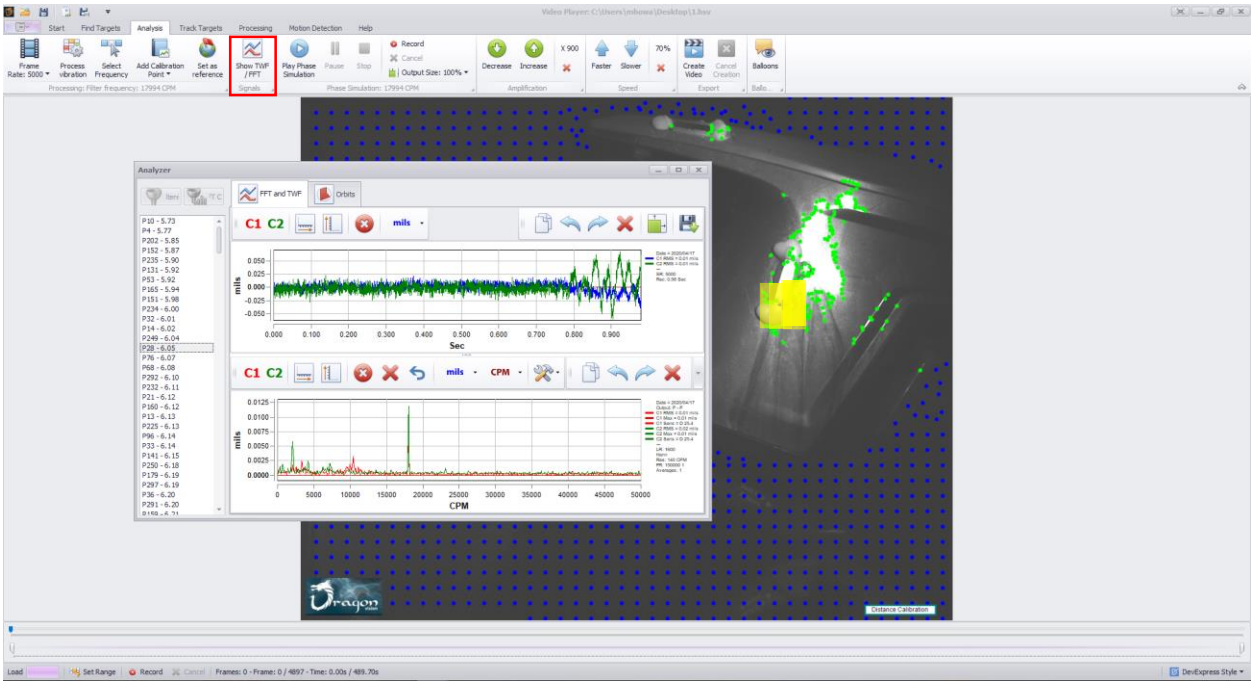
Exporting Animations from within the Video Playback Frame:

If at any time the user would like to save a recording of any **phase** or **motion detection** animation within the Video Playback Frame them can select **Record** from either the footer or main menu and follow the corresponding instructional window to create an animated .gif of the corresponding **phase** or **motion detection animation.**

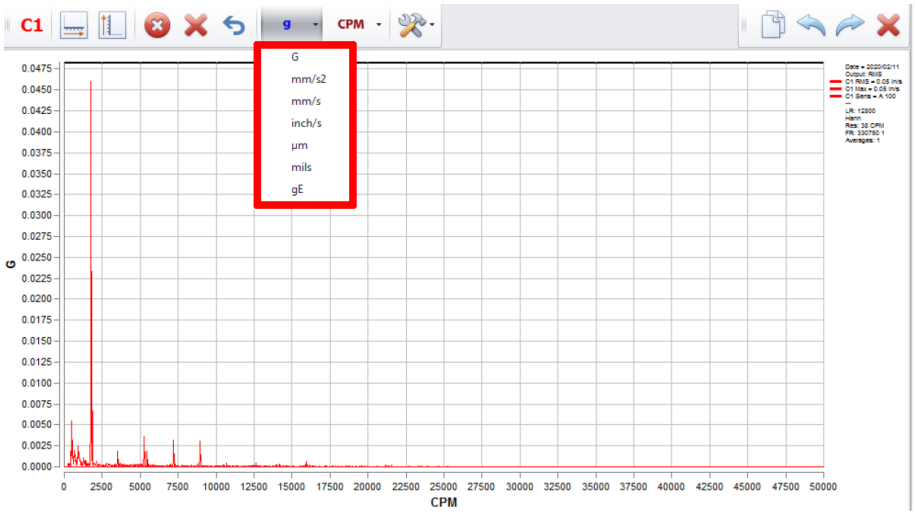


Step 6: Target Waveform & FFT Analysis

The user may at any time select the **Show TWF/FFT** button at any time to review either all or the user selected targets for analysis. Similar to the **Select Frequency** function during the initial processing any targets selected in the **Analyzer** menu will display as a blue crosshair in the Video Playback Frame.



Channel 1 represents the X axis for each target, and Channel 2 represents the Y axis for each target. With the **Analysis** mode the user can independently analyze either the waveform, or spectrum individually or combined for both channels. Frequency can be displayed in CPM, Hz, or Orders and the units of measure available during the analysis mode are as follows:



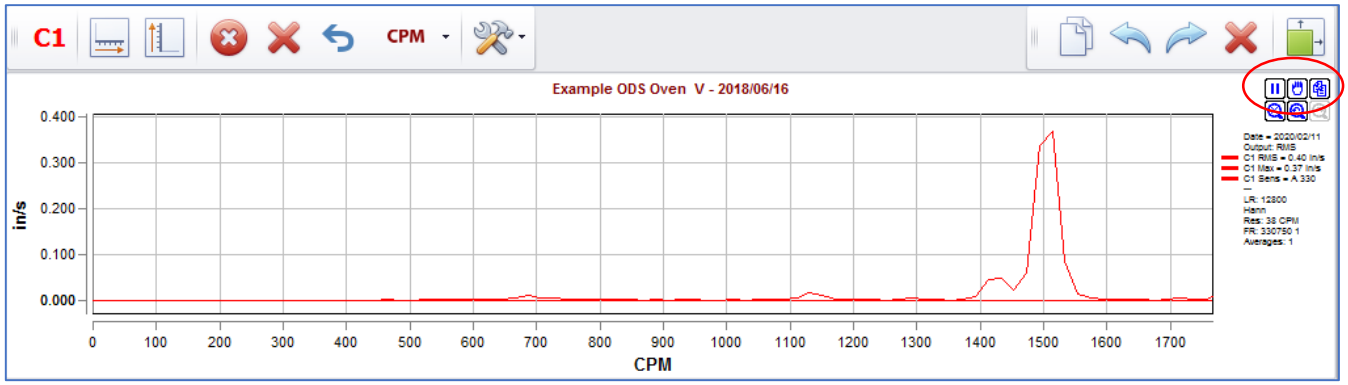
Selecting & Zooming

Magnifying a desired section of waveform or spectrum can be accomplished in a variety of ways. To select a section of the waveform or FFT for closer inspection, press and hold the left mouse button then slide it along the graph over the desired section to magnify. When the left mouse button is released, the selected section will be magnified.

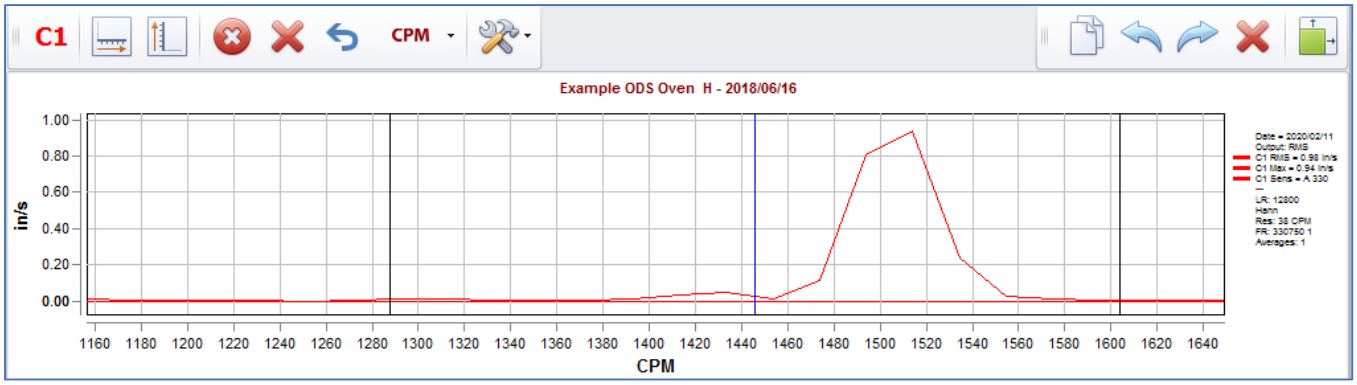
To increase/decrease zoom on only one axis, place the mouse pointer over the axis scale and roll the mouse scroll wheel.

To move the graph view while zoomed, place the mouse pointer over the desired axis scale. Press and hold the left mouse button, then drag the axis scale up/down or left/right

Floating zoom control buttons also appear automatically when the mouse pointer is positioned over an axis.

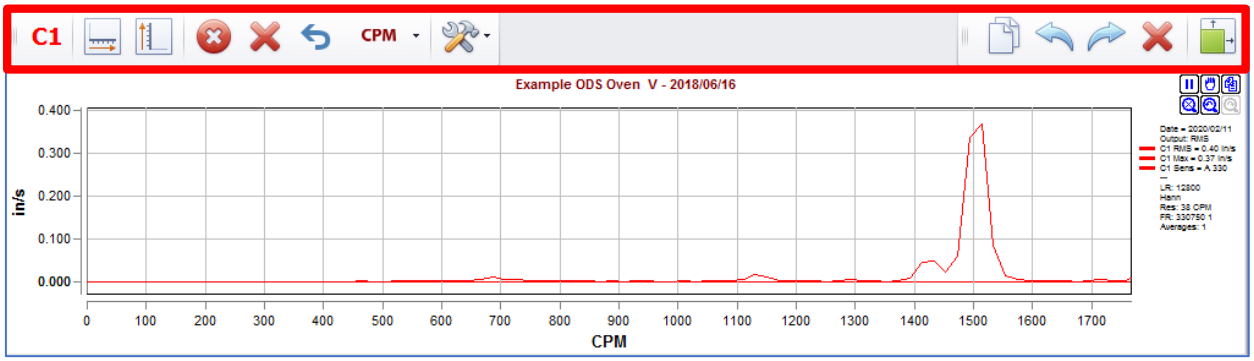


NOTE: Zooming in on any section of the Time Waveform automatically re-renders the FFT, which will appear to be at lower resolution than the FFT of the entire waveform.



Time Waveform/FFT Graph tools

A number of panel control buttons are located above each waveform/spectrum graph.



Click to hide/display channels (more channels may appear if multiple channels are recorded or opened for analysis)

C1

Vertical measurement cursors

Horizontal measurement cursors

Remove cursors

Clear all markers from graph

Clear last marker from graph

Copy graph to paste into a document

Undo zoom

Reset zoom

Clear zoom

Expand panel to full screen / collapse panel back to split screen

Analysis tools

CPM

Changes the graph units between CPM, Hz and Orders

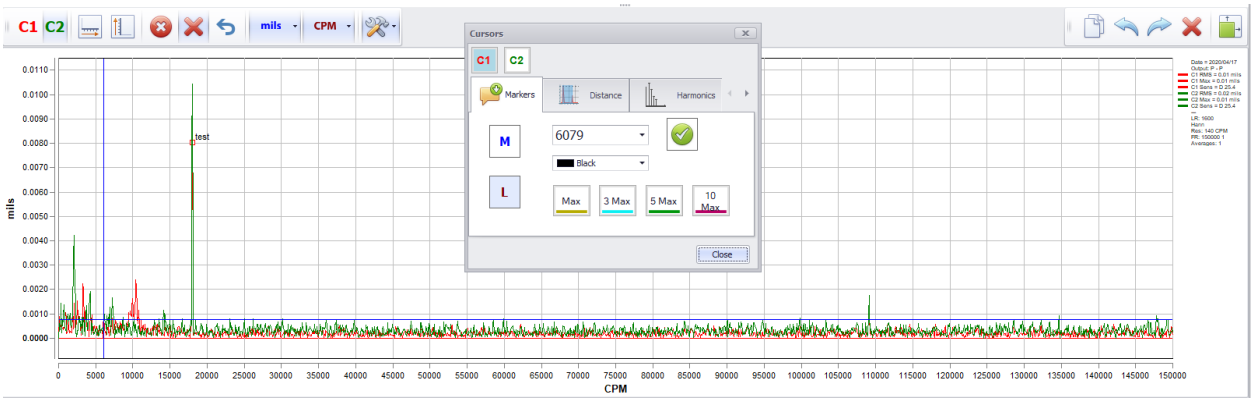
Analysis Tools - Units and FFT Spectrum Windowing

Any recording opened for analysis can be re-rendered immediately to suit user preferences.

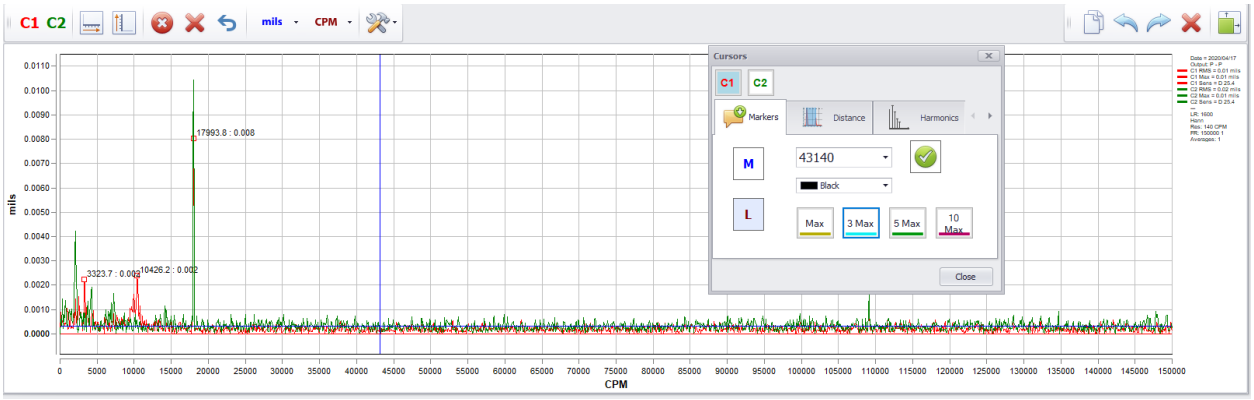
- **Window**: Hanning is usually the default windowing view for FFT spectra. Other options include: Rect, Bartlett, Blackman, Hamming, Kaiser, CosSum and FlatTop.
- **Units**: Imperial and Metric amplitude units for Acceleration, Velocity and Displacement are available.
- **Freq**: Frequency units for Hz. CPM and Orders are available.
- **Graph frequency limit**: Sets the maximum frequency limit of the FFT graph (according to Freq units selected)

The Analysis Tools Menu features essential functions for analyzing collected vibration data:

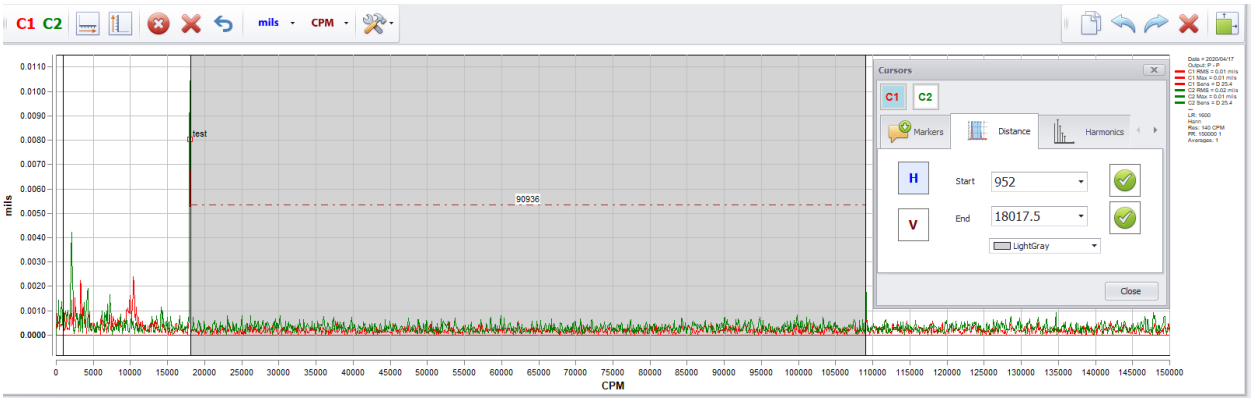
Simple Marker: Allows user to add simple text markers to any point within the graph.



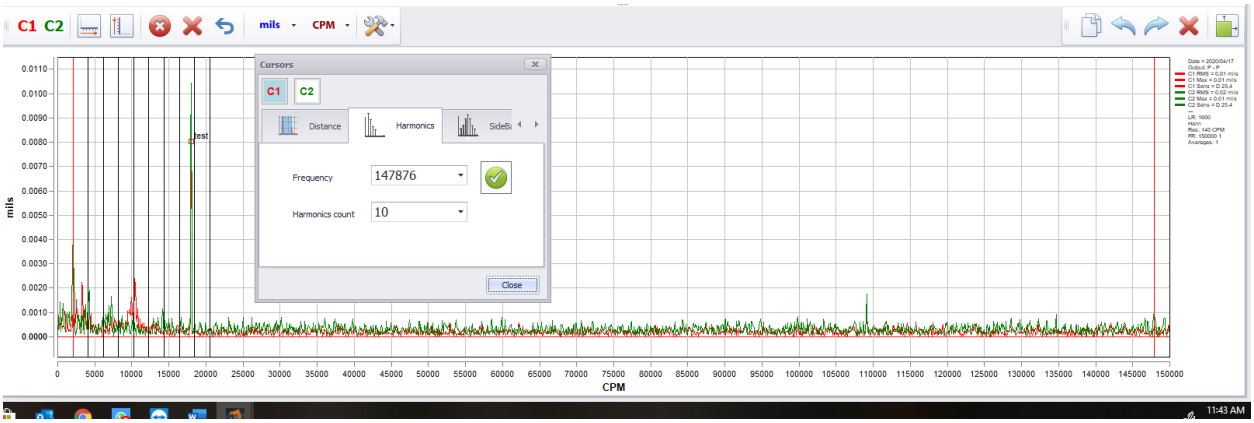
Locate Markers: Allows user to identify Max, Max 3, Max 5 and Max 10 Peaks within an FFT



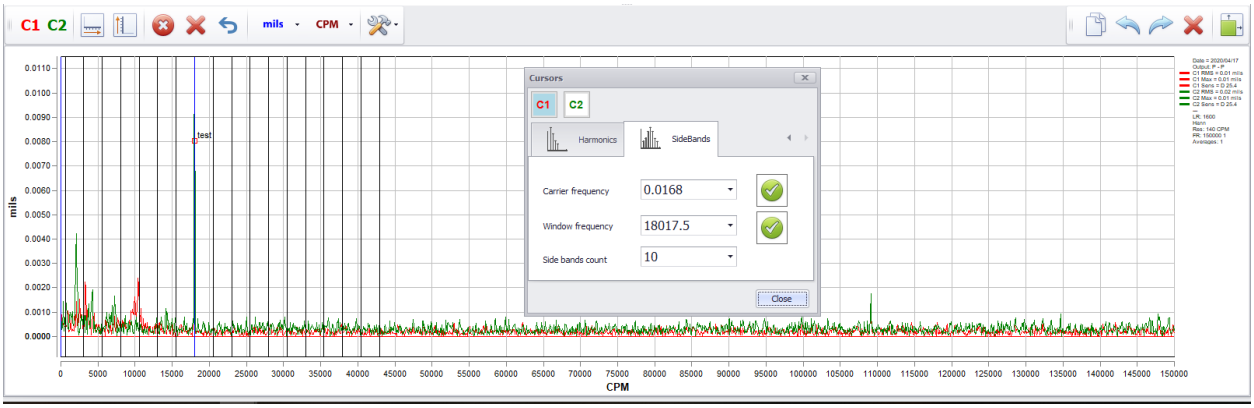
Distance: Allows user to determine the distance between two markers.



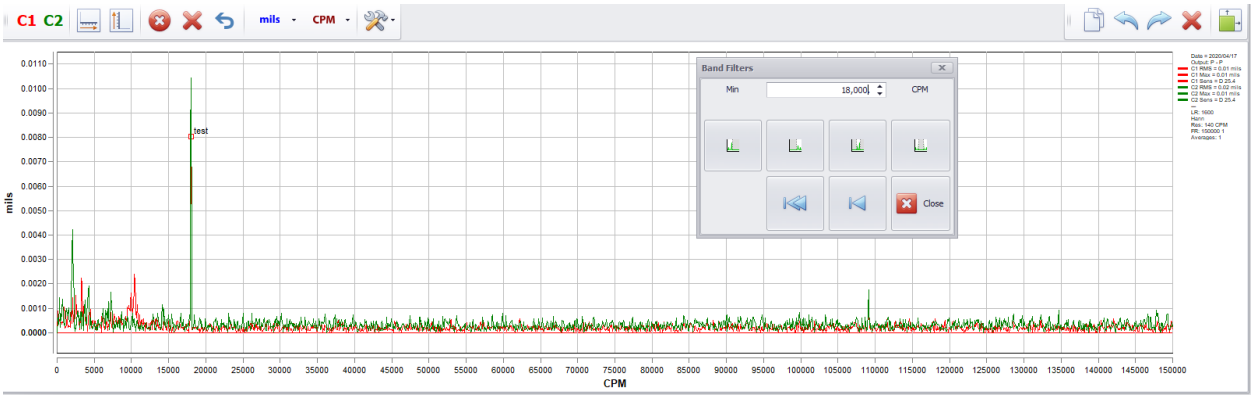
Harmonics: Allows user to select a frequency and plot harmonics of that frequency.



Sidebands: Allows the user to select a frequency and plot sidebands of that frequency.



Band Filters: Allows user to apply low pass, band pass, high pass, and band reject filter methods



Decibels: Converts FFT units to Decibels

Copy: Allows user to copy FFT or Waveform to clipboard as an image

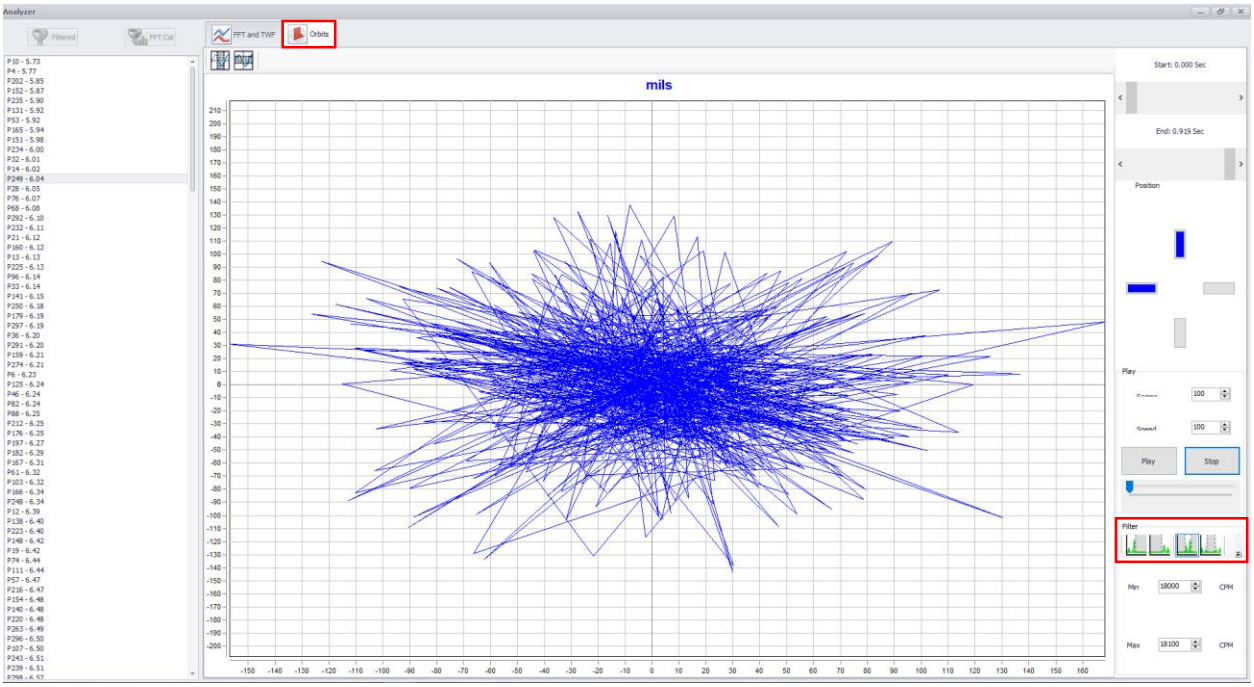
FFT Output: Allows user to select 0-P, P-P, RMS, and Default for FFT view option

Orbits

Displays a static or dynamic graph representing the end travel of a rotating shaft.

NOTE: Orbit Analysis requires simultaneous data collection in the vertical and horizontal planes which each target represents within DragonVision.

Create an orbit plot from the data by clicking on the Orbit button located in the AnalyzerMenu toolbar.

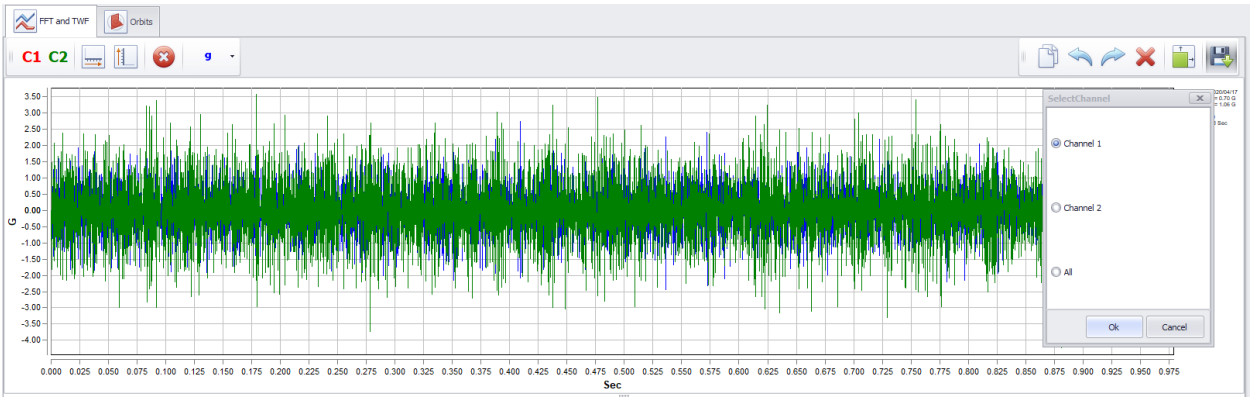


In the orbit view, the duration of the drawing can be adjusted in milliseconds. The rendering speed of the graph can be adjusted by percentage. It is also possible to zoom in to fit an appropriate size. The image can be copied from DragonVision with the right mouse button and pasted elsewhere as a still image.

Observe the dynamic graph in video format by clicking the Start button. Playback can be paused and restarted at any point. A slider bar under the Pause and Stop buttons can be used to manually scroll through the entire Orbit plot.

Below the configuration settings on the right-hand side are Filter tools that can be used to filter Low Pass, Pass Band, Pass High and Block Band to improve the graphical interface.

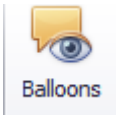
Saving Data for Export & Analysis



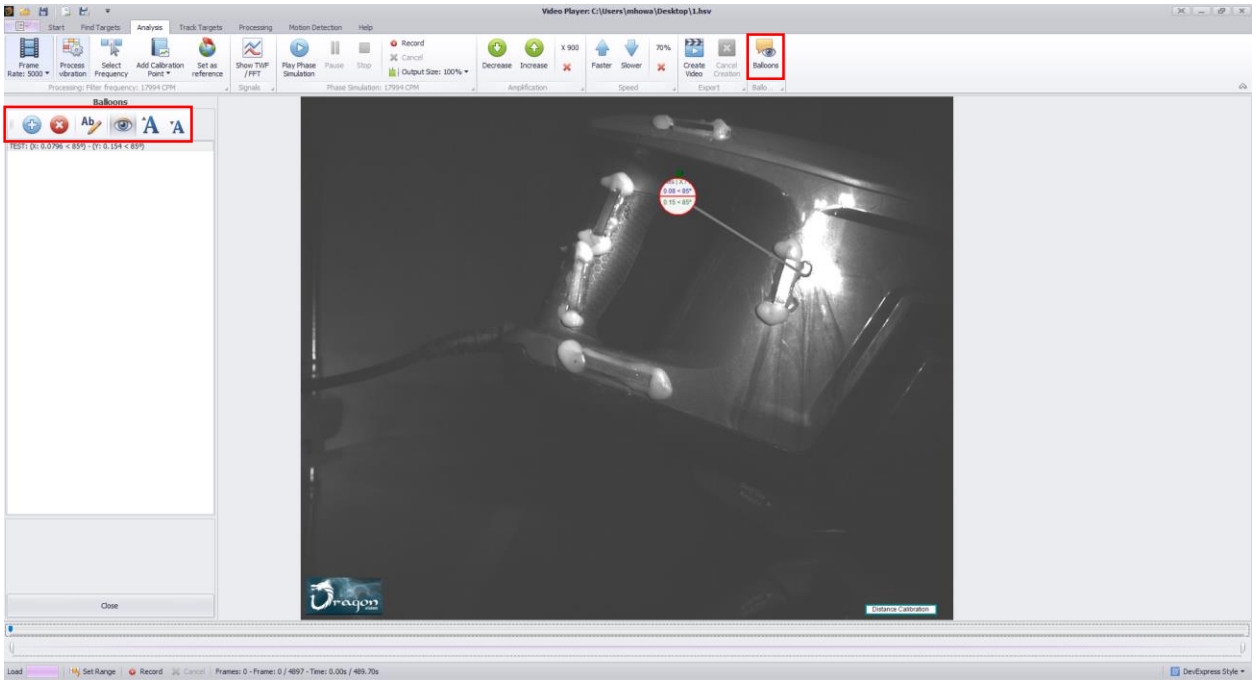
Select the Save As Icon above the Waveform and save the applicable data as an .ANL file for further analysis in DigivibeMX from Erbessd Instruments.

Phase Visualization – Phase Balloons

Allows the user to select with their mouse points within the Video Playback Frame to complete comparative phase analysis of any processed targets.

1. Select Balloons 

2. Select with Mouse targets of interest
3. Select Plus
4. Enter the unique text to identify these points
5. Select **View** to view and compare **phase balloons**



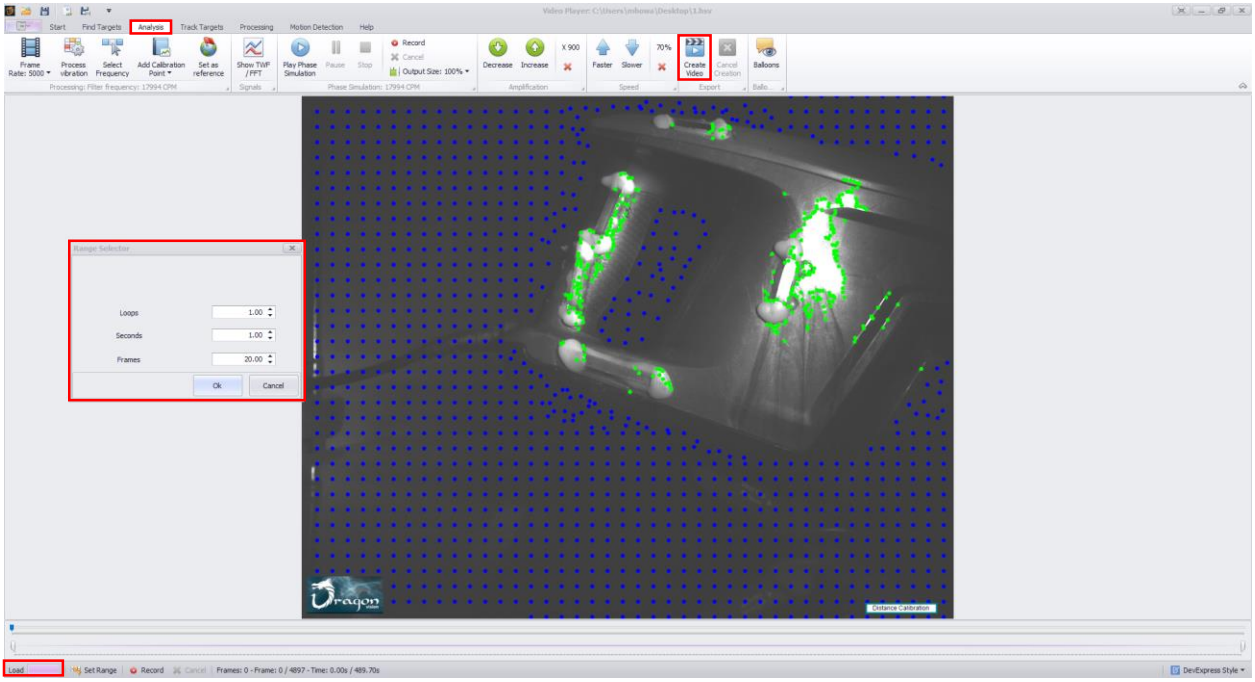
Balloons can be dragged anywhere within the Video Playback Frame based upon user preference.

Balloons Toolbar

NOTE: Balloons can be toggled on and off by selecting either the **Balloons** or **View** buttons.

Step 7: Analysis Menu – Create Video Deflection Model

Within the Analysis Menu the user may select create video any time post video processing to create an animated Video Deflection Model based upon the **Amplification** and **Speed** settings. The method of Video Deflection Model creation within the Analysis menu utilizes the **First Frame Method** whereas the model created applies deflection frequency and amplitude data to the **First Frame** of the video.

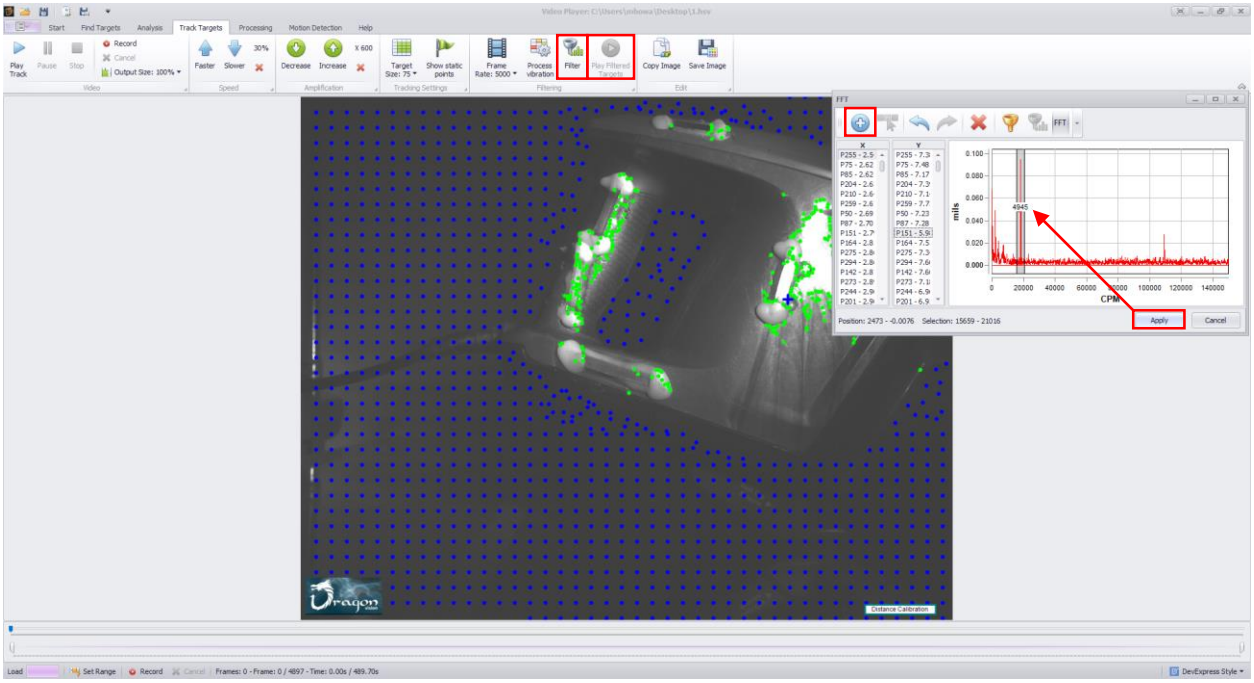


NOTE: The model created will be saved to the user defined directory based upon the user defined settings as an animated .gif file. Model completion status will be displayed in the bottom left of the software interface.

Track Targets Menu

Within the **Track Targets** menu the user may **Play** the processed video, record an output and many other features to visualize target movement from Frame to Frame within the processed video.

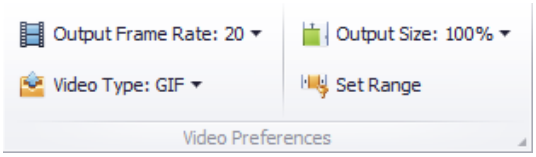
The user can also add filters by selecting the **Filter** option in the main menu, then the **Plus** icon and then left click the FFT frequency range to be filtered. Those filtered targets can then be animated by selecting the **Play Filtered Targets** icon.



Step 8: Processing Menu

Within the processing menu the user can complete several previously described and detailed activities. Key differences within the Processing Menu include:

Video Deflection Model Preferences

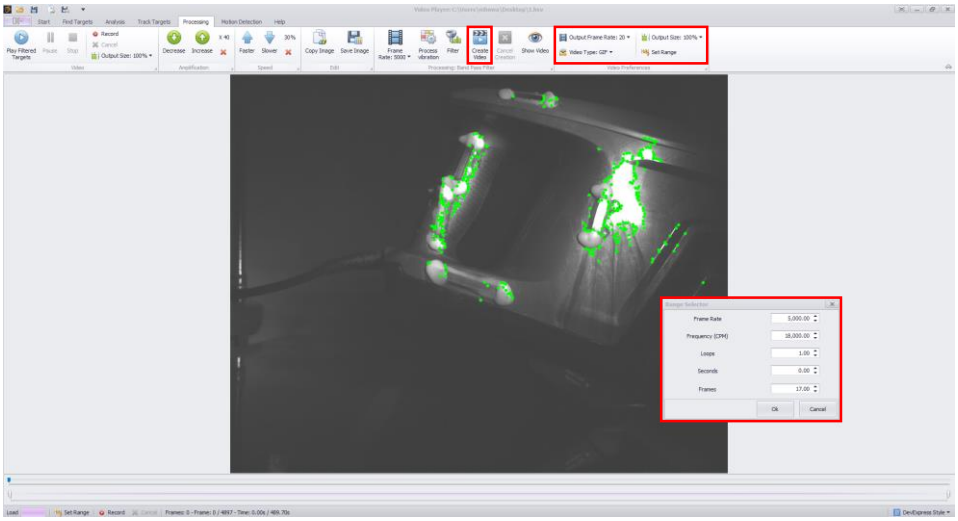


Output Frame: Can be Adjusted

Video Type: Export type can be selected as GIF or MP4

Output Size: Can be Selected

Set Range: Allows user to customize output video deflection model settings



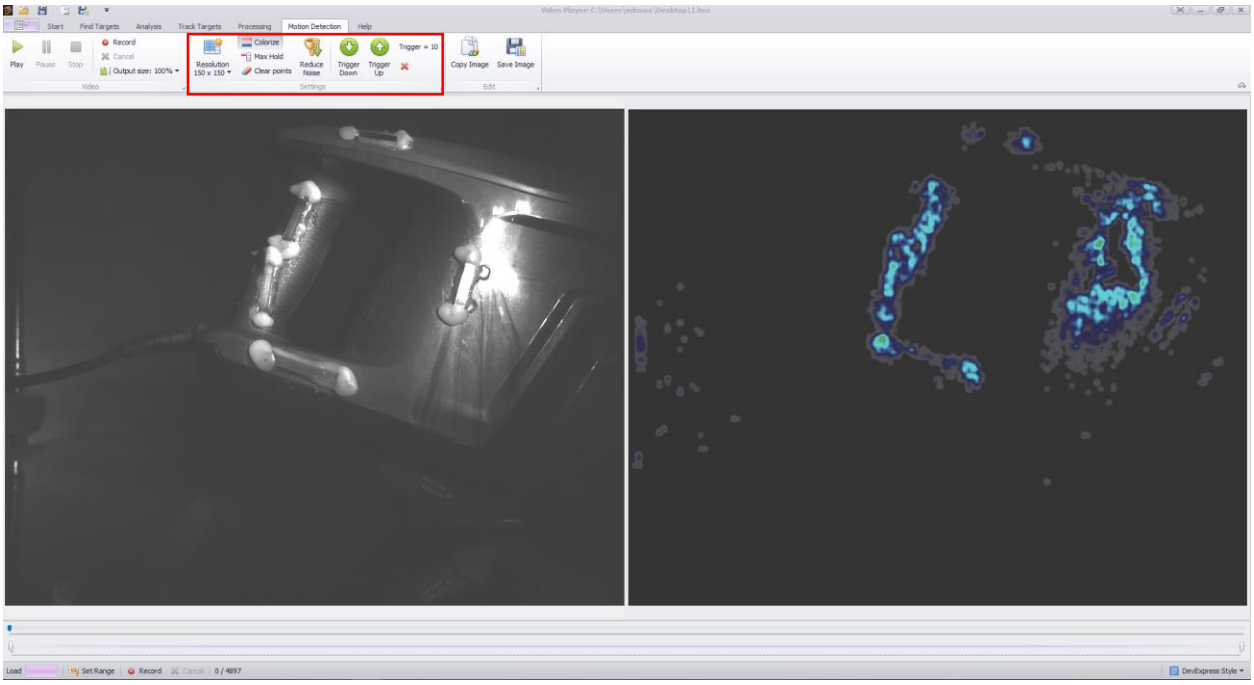
The ability to create a video deflection model based upon Filtered Targets

1. Select **Filter** apply filter as detailed previously and select **Create Video**

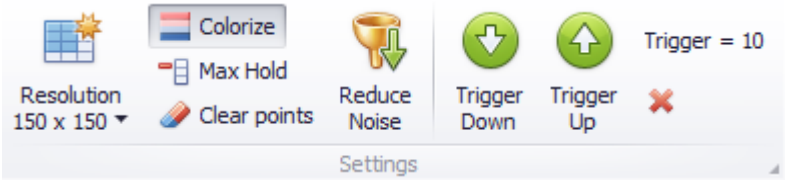
NOTE: any video created within the **Processing Menu** is created using the **All Frames** method. The **All Frames** method creates a Video Deflection Model with, or without **filters** and compares each individual frames target position, frequency, and amplitude to generate a robust model for visualization of deflection based upon user defined preferences. The **All Frames** method takes more time to generate the **Video Deflection Model** then the **First Frame Method.**

Step 9: Motion Detection

The **Motion Detection** menu allows the user to complete a visual comparison of the Source Video and a Colorized or Grayscale animated model that shows the values of displacement for each **target** in a side by side comparison with the source video.



Motion Detection Model Settings



Resolution: allows the user to select the output resolution of the **Motion Detection** model

Colorize: allows the user to select either a color or grayscale **Motion Detection** output model

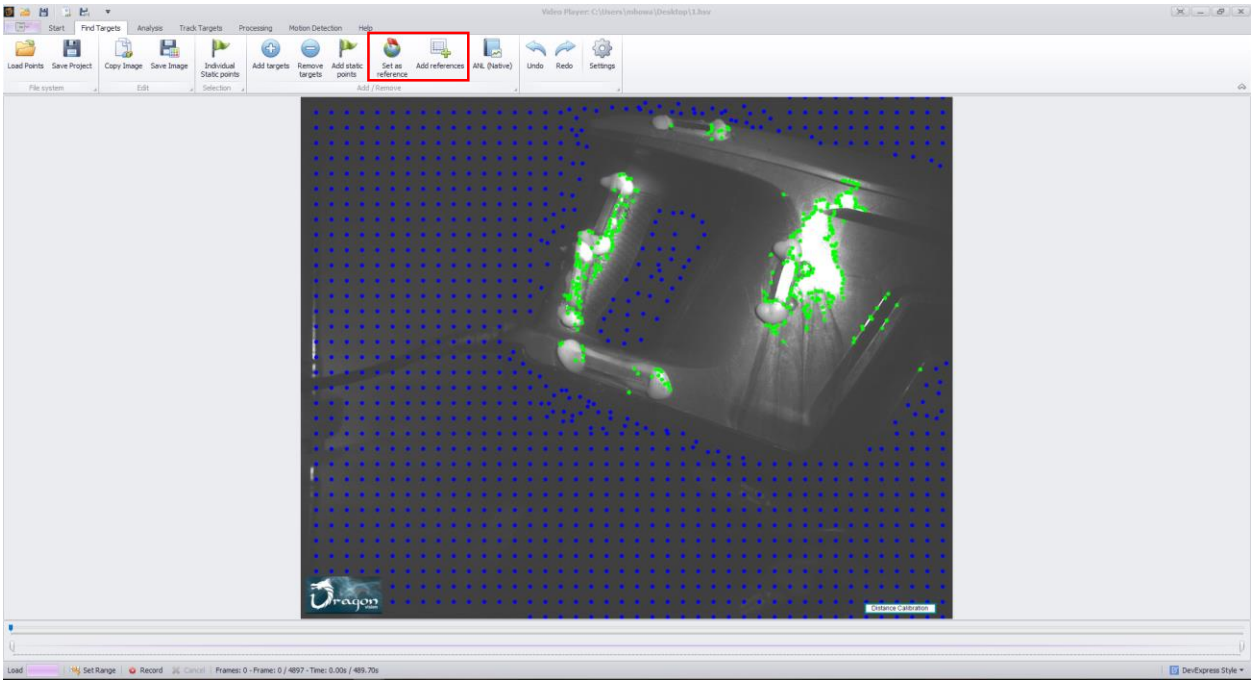
Max Hold: shows the maximum value within each target

Clear Points: Sets to 0 the entire matrix of targets

Reduce Noise: reduces signal interference not related to target activity

Trigger Up/Down: Increases or Reduces the level of displacement required to visualize movement within the **Motion Detection** model.

Differential Analysis & References – Find Targets Menu

Set Reference: This tool allows the user to select a target or series of targets to set as a reference. The selected target(s) average movement will be subtracted from the rest of the unselected targets to calculate the difference in vibration

Add Reference: Reference targets can be identified to track and then will be subtracted from filtered targets from normal targets to filter camera movements.