# **MESCOPE** Installation & Introduction

March 7, 2025



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# **Computer Requirements**

To enlarge this text, *Click* on it, hold down the **Ctrl key** and *spin* the mouse wheel.

MEscope will only run on x64 (64 bit) versions of Windows. To use MEscope, your computer must have at least the following capabilities.

- Microsoft Windows 10, 11, or later, with the latest Service Pack installed
- A hard disk with at least 50 Gigabytes (GB) of available space
- Microsoft **DirectX 11** compatible graphics hardware

To use MEscope in a **Virtual Windows** system, on a **Linux** or on **Apple** computer, the system *must support DirectX graphics hardware*.

# Installing MEscope

MEscope must be installed on a computer hard drive and will only run on the same computer as the hard drive.

### Installing MEscope from the Vibrant Website

• On the Vibrant website www.vibetech.com, *Click* on MEscopeVES Installation on the Software Downloads page



Current MEscope Release	
	DOWNLOAD CURRENT MESCOPE-INSTALLER.EXE
Previous MEscope Release	
	DOWNLOAD PREVIOUS MESCOPE-INSTALLER.EXE
WARNING: If your Software Maintenance & Support (SMS) contact your Sales Representative or sales@vib	has expired, do not download/install this software. Software dated past the en

You have the choice of downloading the Current MEscope Release or the Previous MEscope Release.

### • Double-Click DOWNLOAD CURRENT MESCOPE INSTALLER or DOWNLOAD PREVIOUS MESCOPE INSTALLER

It might take a minute or two to download the MEscope-Installer.exe.

To reduce the installation time, *drag* **MEscope-Installer.exe** from the **Downloads** folder to your desktop.

• *Double-Click* on **MEscope-Installer.exe** on your desktop



MEscope Installation Dialog Box.

The following Installation window will open.

• Click on Next

The License Agreement dialog box will open next.

• Check "I agree to these terms and conditions", and Click on Next

The following dialog box will open next.

• Browse to a different Installation folder if necessary, and Click on the Install button

MEscopeVES 25.00.03.06			×
Operation in progress Please wait while MEscopeVES is being proces	ssed.	THE N	/IBRANT
Installing files			
C:\Program Files\MEscope\AFPolyUtilities.dll			
			11 %
InstaliMate®			
	< Back	Next >	Cancel

MEscope Installation Dialog.



Finish Installation dialog box.

When the MEscope installation has been completed, the dialog box shown above will open.

# **MEscope Security System**

A complete MEscope installation consists of the following parts,

- The MEscope.exe successfully installed on your computer
- An MEscope license file named VTxxxxx.VTL, where xxxxxx is your unique license number, copied to the **desktop** on your computer
- For example, if your license number is 15125, your MEscope license file will be named vt015125.vtl

A USB Security Key must be attached to a USB port on your computer if your license requires one. A Network License Server license or a Software license does not require a USB Security Key.

### If MEscope Won't Run

When you attempt to execute **MEscope.exe**, if you get an error message it could be for one of the following reasons.

- Either the **USB Security Key** or the **Network License Server** software is not properly installed and functional
- The VTxxxxx.VTL license file is missing or corrupted
- The VTxxxxx.VTL license file does not match your USB Security Key or is not recognized by the Network License Server
- The **MEscope.exe** software is corrupted

After checking the above items and reinstalling the software, if you still get an error message, contact Vibrant Technology at <u>support@vibetech.com</u> or call (888) 815-5067 for assistance.

### Help | License Manager

• Execute **Help** | **License Manager** in the MEscope window to open the **MEscope License Manager** as shown below



Help | License Manager.

The license file **VTxxxxx.VTL** selected as **Ready for Use** on the left-hand side of the License Manager authorizes the operation of the MEscope **Package & Options** that were purchased for that license. The Package & Options authorized for the **Ready for Use** license file are listed on the right-hand side of the License Manager window.

# Installing the Network License Server (NLS)

The Network License Server (**NLS**) is a separate network-based software package that can authorize multiple copies of MEscope to run on a computer network.

The **NLS** must be installed on a computer that is accessible by any other computer on which authorization to run MEscope is required. Once the **NLS** is activated on a computer, it cannot be activated on a different computer.

To install the NLS software, execute the following steps,

- Click on Downloads on the Support page of Vibrant website; www.vibetech.com
- Double-Click on Network License Server Installation on the Downloads page
- Double-Click Download NetworkServer.zip



- In the **Downloads** area on your computer, right *Click* and execute **Extract All**
- Execute Vibrant Network Server-Setup.exe
- Follow the on-screen instructions to complete the program installation.

When the **NLS** has been installed, a window will display the Machine ID of the computer on which it was installed.

The Machine ID can also be obtained by executing **Program Files** | **Network License Server** | **Get Unique ID** from the Windows Start menu.

\*\*\* Email the Machine ID to activate@vibetech.com \*\*\*

A VNS\_######.Lic Network Server License file will be emailed back to you.

The VNS\_######.Lic file can be copied to anywhere on the computer on which the NLS is installed.

It is recommended that the VNS\_#####.Lic file be copied to the C:\ Program Files \ NETWORK LICENSE SERVER folder on the NLS computer.

# **Configuring the NLS**

• Execute Program Files | Network License Server | LMTOOLS from the Windows Start menu.

Depending upon your computer security, you might need to *right Click* on the program **LMTOOLS** and execute Run as administrator.

• On the Service/License File tab, select Configuration using Services, as shown below

After the **NLS** has been activated on a computer, it cannot be activated on a different computer.

	Inc.			
File Edit Mode Help				
Service/License File System Se	ntings   Utilities   Start/Stop/Ren	ead Server Status Server	Diags Config Servic	ces Borrowing
Services allow FLEXnet	Servers to run in the background.			
Server List				
	00	Configuration using License F	ile	
6.65	• • • •	Configuration using Services		
1.27				
1 Com	·			
	7			
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IND PLEXIM Services defined.	use Contigure Services to add s	ervices		
OOLS by Flexera Software, Inc.		2.2		
OLS by Flexera Software, Inc. Edit Mode Help				
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On the **Config Services** tab,

- Enter a Service Name, such as "Vibrant Server"
- Enter the Path to the **Imgrd.exe** file. (This will typically be found in the C:\ **Program Files** \ **NETWORK** LICENSE SERVER folder)
- Enter the Path to the VNS\_######.Lic file
- Check Use Services and check Start Server at Power Up
- *Click* on the **Save Service** button
- On the **Start/Stop/Reread** tab, *Click* on the **Start Server** button
- On the Server Status tab, *Click* on the Perform Status Enquiry button

The status of the license server is listed, as shown below. The server port and server name are also listed.

The format **port@server name** is used to connect to the server.

In the example shown below, to connect to this NLS, enter 27000@vtserver when prompted.

To connect to an NLS through port 27000@vtserver, the License server status 27000@vtserver should be entered in MEscope when prompted.

File Edit Mode Help         Service/License File       System Settings       Utilities       Start/Stop/Reread       Server Status       Server Diags       Conlig Services       Borrowing         Helps to monitor the status of network licensing activities       Options       Individual Daemon       Individual Daemon         Perform Status Enquity       Individual Feature       Server Name       Server Name         Flexible License Manager status on Tue 5/24/2011 14:41 <ul> <li>(Detecting lagrd processes)</li> <li>License server status: 27000@VTSERVER</li> <li>License file(s) on VTSERVER:</li> <li>C:\Program Files (x86)\Vibrant Network</li> <li>Server\VNR</li> <li>Sil25.Lic:</li> </ul>
Service/License File System Settings Utilities Start/Stop/Reread Server Status Server Diags Config Services Borrowing Helps to monitor the status of network licensing activities Perform Status Enquiry Options Individual Daemon Individual Feature Server Name Flexible License Manager status on Tue 5/24/2011 14:41 (Detecting lagrd processes) License server status: 27000gVTSERVER License file(s) on VTSERVER: C:\Program Files (x86)\Vibrant Network Server\VNS 15125.Lic:
Helps to monitor the status of network licensing activities          Perform Status Enquity       Individual Daemon         Individual Feature       Server Name         Flexible License Manager status on Tue 5/24/2011 14:41 <ul> <li>(Detecting lagrd processes)</li> <li>License server status: 27000@VTSERVER</li> <li>License file(s) on VTSERVER: C:\Program Files (x86)\Vibrant Network</li> <li>Server\VNS 15125.Lic:</li> </ul>
Flexible License Manager status on Tue 5/24/2011 14:41 (Detecting lagrd processes) License server status: 27000@VTSERVER License file(s) on VTSERVER: C:\Program Files (x86)\Vibrant Network Server\VNS 15125.Lic:
Using License File: C:\Program Files (x86)\Vibrant Network Server\VNS 15125.Lic

### **Configuring the Server Firewall**

The Firewall on the computer hosting the **NLS** needs to have inbound TCP exceptions set up allowing all MEscope users access via the network.

The configuration depends upon the Firewall being used. The following Firewall exceptions are required,

- The port used by the NLS, which is usually a number between 27000 and 27009.
- The daemon, **VIBETECH.exe**, which is typically found in the **C:\Program Files\ Network License Server** folder.

# **Using the Network License Server**

• Start MEscope

If the NLS is not found, the following dialog box will open.

Vibrant License Server		
Your Vibrant License Serve the name or address of th Vibrant Licer	er was not found. Specify e computer running your nse Server.	
27000@vtserver		
ОК	Cancel	

The port and server name for the NLS should be entered using the format port@server name, as shown below.

### If Communication with the NLS is Slow

If you have difficulty connecting to the **NLS**, it may be that communication with the license server computer is slow and it has timed out. To address this issue,

- Open the Windows System Control Panel and enter sysdm.cpl in Search Programs and Files
- Select the Advanced tab on the panel
- Execute Environment Variables
- Create a new environment variable named FLEXLM\_TIMEOUT and a time out in microseconds.
- The default time out is 100,000 microseconds (0.1 seconds)
- Reboot the computer to apply this change

Pinging the server computer can show how long communications take with the server computer. Ping will show the *time to communicate* in milliseconds (1 millisecond=1000 microseconds).

- Open the Windows Command line and enter cmd in Search Programs and Files
- Enter **Ping** followed by the server's name, as shown below

	C:\Windows\System32\cmd.exe	-	×
Microsoft Windows [U (c) 2013 Microsoft C	ersion 6.3.9600] orporation. All rights reserved.		^
C:\Windows\System32>	ping vt-dc1		
Pinging UT-DC1.vt.lo Reply fron 192.168.1 Reply fron 192.168.1 Reply fron 192.168.1 Reply fron 192.168.1	cal [192.168.10.10] with 32 bytes of data: 0.10: bytes=32 time=2ms ITL=128 0.10: bytes=32 time<1ms ITL=128 0.10: bytes=32 time<1ms ITL=128 0.10: bytes=32 time<1ms ITL=128		
Ping statistics for Packets: Sent = Approximate round tr Minimum = Øms, M	192.168.10.10: 4, Received = 4, Lost = 0 (0% loss), ip times in milli-seconds: aximum = 2ms, Average = 0ms		
C:\Windows\System32>			
			~

# Borrowing a License from the NLS

To run MEscope without being on the network with the NLS, a license must be borrowed from the NLS.

A borrowed license is node locked to the computer running MEscope, making that license unavailable to other users of the **NLS** until it is returned to the **NLS**, or *30 days has expired*, whichever occurs first.

A borrowed license will be returned to the server when MEscope is closed down on your computer

To borrow a license from the NLS,

- Run MEscope while connected to the NLS
- From the MEscope Help menu, execute Help | License Manager

The MEscope License Manager dialog box will open, as shown below.

📑 MEscope License Manager		— 🗆 X
15125 Status: Authenticated	Apr 30, 2021	License Information License Server Server Location
19622 Status: Not valid for this computer 19622 Status: Unactivated	Apr 30, 2021 Apr 30, 2021	License Server Location: vtis.vibetech.com Test Borrow Status: Not borrowed Borrow though: Saturday , February 13, 2021
Add Remove	Use	License Status Current Status: 6 of 7 seats available Seats in use: - User\User-PC OK

- *Click* on the **License Server** tab to display the License Server as shown above
- Select a **Borrow through** date

If the date and time settings are not changed, the license will be *borrowed for the rest of the day*.

- *Click* on the **Borrow** button
- *Click* on the **OK** button to close the **License Manager**, and continue using MEscope with a **borrowed** license

# Installing the MEscope Data Viewer

MEscope can be used as a **Data Viewer** on a computer without a valid MEscope license. If the Software Maintenance & Support (**SMS**) on your license is current, you can share your Project files with others who don't have a valid MEscope license on their computer.

Send your Project file and a copy of your **VTxxxxx.VTL** MEscope License file to the person wanting to use MEscope as a Data Viewer, along with the following instructions,

- Download http://files.vibetech.com/MEscope-Installer.exe
- Copy the attached **VTxxxxx.VTL** MEscope License file into the same folder as MEscope-Installer.exe
- Execute MEscope-Installer.exe to install MEscope and the license file
- Execute Start Menu | All Programs | Vibrant Technology, Inc. | MEscope Data Viewer

# Introduction

MEscope is a series of software packages & options that makes it easier for you to acquire, analyze, observe and document noise & vibration in mechanical structures and operating machinery. You can use MEscope for a wide variety of engineering tasks.

- Operating Deflection Shape (ODS) Analysis
- Experimental Modal Analysis (EMA)
- Operational Modal Analysis (**OMA**)
- Vibration & Acoustic Signal Processing
- Multi-Input Multi-Output (MIMO) Modeling & Simulation
- Structural Dynamics Modification (SDM)
- Finite Element Analysis (**FEA**)

MEscope can also be used as the *"heart"* of an acquisition & post-processing system for remotely monitoring, analyzing, and diagnosing failures in operating machinery, or in structures such as bridges and wind turbines. When used together with its **archival database** and operator **Console graphics software**, MEscope can be used for,

- Machinery Health Monitoring (**MHM**)
- Structural Health Monitoring (SHM)
- Environmental Noise & Vibration Monitoring
- Machinery & Structural Qualification Testing



Animated ODS Display Using a Photo Realistic Model.

### Animated ODS & Mode Shape Display

All MEscope packages contain a state-of-the-art interactive display for animating spatially defined shapes on a 3D model of a machine or test article. Shape data such as an operating deflection shape (ODS), mode shape, acoustic intensity shape, or sound power through a surface can be displayed in animation on a photo realistic model, like the one shown above. Displaying spatially defined shapes in animation makes it easier to visualize and analyze structural noise & vibration problems.

### **Observing Vibration in Slow Motion**

By animating the *spatial response* of a structure in *slow motion*, you can view *overall motion* of a structure, and the motion of *one portion relative to another*. Locations of *excessive vibration* or *high noise levels* are easily identified.

- With interactive *sweep animation*, you can sweep through a set of time wavforms and observe the *recorded response* of a machine or structure, whether its vibration is *sinusoidal*, *random*, *transient*, *linear*, *non-linear*, *stationary* or *non-stationary*
- With interactive *sine dwell animation* or *stationary dwell*, you can dwell at a specific time in a set of response time waveforms, or at a frequency in a set of frequency spectra, and examine the deflected shape

# **Types of Data Imported**

Every MEscope package can import multi-channel time-based or frequency-based data from a wide variety of third-party data files.

• File formats used by all popular multi-channel data acquisition systems, analyzers, recorders, and data collectors are supported

Most popular file formats are supported, including ASCII text spreadsheet, MATLAB, DADiSP, Microsoft WAV, and Universal File Format (UFF).

The following types of measurement functions are recognized by MEscope.

### *Time Domain Functions*

- Time Waveform(TWF)  $\rightarrow$  vibration, sound pressure, strain gauge, temperature, etc.
- Auto Correlation (A-COR)
- Cross Correlation (X-COR)
- Impulse Response Function (IRF)

### **Frequency Domain Functions**

- Fourier Spectrum → Digital Fourier Transform (DFT) of a uniformly sampled Time Waveform (TWF)
- Auto Power Spectrum (**APS**)
- Cross Power Spectrum (**XPS**)
- Power Spectral Density (**PSD**)
- Frequency Response Function (**FRF** ) → (Response **DFT** / Force **DFT**)
- Transfer Function (**TRFN**) → (Output **DFT** / Input **DFT**)
- Transmissibility (**TRN**) → (Roving response **DFT** / Reference response **DFT**)
- Coherence → Ordinary Coherence (COH), Multiple Coherence (M-COH), Partial Coherence (P-COH)
- **ODS-FRF** (Roving response Auto Spectrum + phase relative to a Reference response)
- Acoustic Intensity (INTEN)
- Sound Pressure Level (SPL)

# **Time-Based ODS Animation**

With MEscope, you can animate **time-based Operating Deflection Shapes** (**ODS's**) directly from multi-channel data that was acquired spatially from a machine or structure.

• Time-domain Sweep Animation is done by sweeping a cursor through a set of time waveforms

You can stop the animation, back it up, and play it forward to observe in slow motion vibration phenomena that may have taken place very quickly in real time. You can observe in slow motion the run up, coast down, or other transient behavior of a machine. During these transition periods, the machine may pass through a variety of vibrational states, due to resonances, unbalances, varying loads, fluid flow, etc.



Sweep Animation from Multi-Channel Time Responses.

# **Frequency-Based ODS Animation**

With MEscope, you can animate **frequency-based Operating Deflection Shapes (ODS's)** directly from data that was acquired from a machine or structure

• During Sine Dwell animation, the **ODS** at a specific frequency is displayed using sinusoidal modulation

A frequency-based **ODS** allows you to see how a structure behaves at a single frequency. While dwelling at a frequency, the **ODS** will show you *where vibration levels are highest* and will indicate loose parts and connections. You can display order-based **ODS**'s and determine how resonances are participating in the overall vibration.



Sine Dwell Animation of a Frequency-Based ODS at a Resonance.

# **Mode Shape Animation**

Modes of vibration are used to characterize resonant vibration in machinery and structures.

- All structures have specific *natural frequencies* at which they readily absorb energy
- When a resonance is excited, it can cause *excessive noise and vibration*, resulting in premature structural failures
- Each resonance is defined by its natural frequency, damping, and mode shape
- At or near a modal frequency, the response of a structure is usually dominated by the resonance
- A *frequency-based ODS* will often *look like* the mode shape of a nearby resonance, if the resonant response *dominates the ODS*

However, mode shapes, along with their frequency and damping values, are more accurately obtained by curve fitting a set of **FRF** s, or Fourier spectra, Cross spectra or **ODS-FRF** s calculated from operating data.



Sine Dwell Animation of a Mode Shape.

# Projects, Data Files, and Windows

All work in MEscope is done in the *currently open Project file*.

• Only one Project file can be open at a time in MEscope

A Project file (with file name extension VTprj or VTmax) can contain one (or more) of the following data files,

- Structure (**STR**) file
- Data Block (**BLK**) file
- Shape Table (SHP) file
- Acquisition (ACQ) file
- Report (**RTF**) file
- Script (VSL) file
- Added Files

All data in these files (except Added Files), is saved within the Project file on disk.

• Added Files are stored separately on disk and are opened from MEscope in a separate application program.

### **MEscope Window**

• The MEscope window is *always open* when MEscope is running



### MEscope Window.

### Data File Windows

A separate window is used to display and manipulate the contents of each data file within the *currently open* **Project**. When a data file is opened, a *copy* of its contents on disk is put into RAM memory and displayed in its own window. Each window name is preceded by its window type, followed by a colon

- A Structure file is displayed in an STR window
- A Data Block file is displayed in a BLK window
- A Shape Table file is displayed in an SHP window
- An Acquisition file is displayed in an ACQ window
- A **Report** file is displayed in an **RTF** window
- A Script file is displayed in a VSL window



MEscope with a Structure (STR) and Data Block (BLK) Window Open.

# **Saving Data Files**

- When a file is saved in MEscope, its file contents in RAM memory *replace the contents of the file* in its **Project** file stored on disk
- If a Project *is closed without saving changes* to one of its data files, the file *contents in memory will be lost*. The contents of that file on disk *will not be changed*.

### **Mouse Operations**

To enlarge this text, *Click* on it, hold down the Ctrl key and spin the mouse wheel.

Many operations in MEscope require the use of the Windows mouse. Commonly used mouse operations include;

- Selecting by *pointing & clicking* with the *left mouse button*
- Displaying a context menu by *clicking with the right mouse button*
- Panning a View by *dragging with the left mouse button*
- Rotating the model in the 3D View or the Waterfall by dragging with the right mouse button
- Zooming the graphics or scrolling a spreadsheet by spinning the mouse wheel

# **Window Operations**

More than one data file window is usually open for use in MEscope. Learning how to *open*, *close*, *move*, *arrange* & *re-size* windows is important for arranging them together in the Work Area.

### Make a Window Active

- *Click* anywhere within a window to make it the *active* window
- The title bar of the *active* window is darkened or colored

### Center the active Window in the Work Area

• To center a window in the Work Area, execute **Display** | **Center Window** either from the **right** *Click* **menu** or from the **menu bar** 

### Center the MEscope Window on the Desktop

• Execute Display | Center MEscope Window on the upper tool bar in the MEscope window

### Move a Window

• Position the mouse pointer *on the title bar* (on the top of the window), and *Click & drag* the window to the desired position

### Resize a Window

- Hover the mouse pointer over one of its edges so that the mouse pointer changes to a double arrow
- Then Click & drag the edge

### Close a Window

• *Click* on the close button **w** in the *upper right corner* of the window

### Maximize a Window

• *Click* on the maximize button in the *upper right corner* of the window

### Minimize (Icon) a Window

• *Click* on the minimize \_ button in the *upper right corner* of the window

### Restore a Minimized Window

- 1. Double-Click on its Icon on the bottom of the Work Area
- 2. Or *Double-Click* on its file name in the **Project Panel**
- 3. Or Click on its file name in the Windows | Open Windows list in the MEscope window

# **Tool Tips**

Each command in MEscope has a Tool associated with it.

- A Tool is a *graphical button* that accompanies the command in its menu
- A Tool Tip is a **brief description** of a command (typically its *menu location* and *name*)

### Help / Show Tool Tips

When this command is *checked*, the display of Tool Tips is enabled.

- *Click* on a window to make it *active*
- Hover the mouse pointer over any Tool on a Toolbar or the Ribbon to display its Tool Tip



Structure Window Showing a Tool Tip.

# **Command Ribbon & Toolbars**

Most of the MEscope commands are contained in menus. Commands for each window can be displayed differently by choosing one of three styles.

• A command menu style is chosen on the Display tab in the Project | MEscope Options box

### **Command Ribbon**

A Ribbon of commands for the *active window* and the commands for the MEscope window are displayed on the top of the MEscope window.

### Single Menu

A Toolbar of commands for the *active window* and the commands for the MEscope window are displayed on the top of the MEscope window.

### Window Menu

This Toolbar of commands is displayed on the top of each window.

### Adding Commands to a Toolbar

- Any command can be added to the command Toolbar for that window
- Any command can be added to an existing Toolbar, or a new Toolbar can be created

### **Moving a Toolbar**

Toolbars can be *floated* or *attached* to one of the *four sides* of the MEscope window

• Place the mouse pointer over the *beginning area* II on the (*left or top*) of the Toolbar

The mouse pointer will change to crossed arrows.

• *Drag & drop* the Toolbar to anywhere inside the MEscope window

### **Customizing a Toolbar**

- *Position* the mouse pointer in the **menu** or in the **Toolbar** area, *right Click*, and execute **Customize** from the floating menu
- Or *Click* on the **More Tools** command **t** at the end of a Toolbar and execute **Add or Remove Tools** | **Customize**
- The Toolbar Customize dialog box will open, as shown below

Customize		×
Toolbars Commands Categories: Ali Commands Animate Display Draw Edit FEA File Help Hotkeys M#Links Movie Modify Selectio	Options Commands File A A Display Windows A Help A Project A New A Import A Rearrange Commands	]
	Keyboard Close	

Toolbar Customize Dialog Box.

### Adding a Tool to a Toolbar

- Open the **Customize** dialog box
- *Click* on the **Commands** Tab in the Customize dialog box
  - The menus for the window will be displayed in the Categories list
- *Click* on the menu name in the **Categories** list to display the commands in that menu
- Click & drag a Tool from the Commands list onto the Toolbar (until an I beam is displayed), and drop it

### Moving a Tool to Another Toolbar

- Open the **Customize** dialog box
- Click & drag a command Tool from the Toolbar and drop it onto another Toolbar

### **Repositioning a Tool on a Toolbar**

- Open the **Customize** dialog box.
- Click & drag a command Tool from its position and drop it into its new position on the Toolbar

### **Removing a Tool from a Toolbar**

- Open the Customize dialog box
- Position the mouse pointer on the Tool and *Click & drag* it off the Toolbar

### **Creating a New Toolbar**

- Open the **Customize** dialog box
- *Click* on the **New** button in the Customize dialog box
- Enter the name of the new Toolbar in the dialog box that opens
- The new Toolbar is displayed in the Toolbar area at the top of the window

### Locking the Toolbars

- *Right Click* in the menu or in the Toolbar area, and execute Lock the Toolbars
- If Lock the Toolbars is *checked*, the Toolbars are locked in position.

### **Hidden Floating Toolbars**

Floating Toolbars will become hidden behind other windows whenever their window is not the active window.

• To make floating Toolbars visible, Click anywhere on a window to make it the active window

### **Resetting the Toolbars**

- Execute File | MEscope Options in the MEscope window to open the Options dialog box
- On the Display tab, *press* Toolbars in the Clear User Settings section

# **The MEscope Window**

The MEscope window is always open when MEscope is running.

Click on its close button is to terminate the operation of MEscope

The MEscope window contains a **Command Menu**, a **Ribbon or Toolbar**, a **Project** tab, and File Folders tabs, all normally located at the top of the window, as shown below.

The Work Area is in the center, and the Status Bar is located on the bottom left of the window.

### **Current Project Fly-out Panel**

The Current Project Fly-out Panel contains two panes, separated by a moveable red splitter bar.

One pane lists the data files in the *currently open* **Project** file, and the other pane lists the Project files in the current disk folder.

• Click on the Current Project tab to display the Current Project Fly-out Panel



Current Project Fly-out Panel.

# Work Area

The center of the MEscope window is called the Work Area.

All data file windows in the *currently open* Project are opened into the Work Area.

- Execute one of the commands in the **Window** | **Arrange Windows** menu to arrange the open windows in the Work Area
- Right Click in any window and execute Display | Center Window to center it in the Work Area

# **Projects Tabs**

In addition to the **Current Project** tab, *several* **Projects** tabs are added to the MEscope window when it is installed.

• Click on a Projects Tab to open its *fly-out panel* containing the MEscope Projects in that folder

**Opening a Project From a Projects Tab** 

- Hover the mouse pointer over each Project thumbnail (picture) on the panel to display its name
- **Double-**Click on any Project in a fly-out panel to open the Project
- *Move* the mouse pointer *off a fly-out panel* to close it



Demos Tab Fly-out Panel.

Moving a Fly-out Panel

- *Click* on a Projects Tab to open its fly-out panel
- *Click* on the **pin icon** in the *upper right corner* to **pin the fly-out panel open**, as shown below

🚦 VT-950 Visual STN: Vibrant Beam Demo.VTprj	– 🗆 X
E E A Project Windows File Display Edit M#s Cursor Format Tools Transform Curve	Fit Acoustics Script Help 🗖 🚺
Current Project Demos Machinery	
Vehicles	÷ +
fly-out	panel pinned
STR: Vibrant I-Beam - 3D View	
3D View	

Pinned Fly-out Panel.

• *Drag* the *pinned* fly-out panel into the *middle* of the Work Area

Notice that *four arrow icons* appear near the *top*, *bottom & sides* of the Work Area.

- Drag the pinned fly-out panel onto an arrow icon to attach it to the top, bottom or a side of the Work Area
- *Click again* on the **pin icon** in the *upper right corner* to **un-pin the fly-out panel**

### **Opening a Previously Saved Project File**

There are several ways to open a previously saved Project

- Execute **Project** | **Open** in the MEscope window
- Select the Project from the list of **Recent Projects** in the **Start Page** window
- Double-Click on the Project file name in the (right or lower) pane of the Current Project Fly-out Panel
- *Right Click* on the file in the (*right or lower*) pane of the **Current Project Fly-out Panel**, and select **Open** from the context menu

### Creating a New Project

• Execute Project | New in the MEscope window

If another Project is already open, you will be asked to save the current Project file before creating a new Project.

### Creating a New Data File

• Execute one of the commands in the File | New menu in the MEscope window

### Adding a File from Another Project

- *Double-Click* on the file from another Project in the (*right or lower*) pane of the **Current Project Fly-out Panel**
- Or *right Click* on the file in the (*right or lower*) pane of the **Current Project Fly-out Panel**, and select **Add** from the context menu

### Importing a Data File

• Execute one of the commands in the **File** | **Import** menu in the MEscope window

# Structure (STR) Window

A Structure (**STR**) file contains a 3D geometric model of a test article or acoustic surface on which shape data will be displayed in animation. Each structure model is defined using Points, Lines, and Surfaces (*Surface Triangles or Surface Quads*).

A Structure window is used for several purposes,

- Drawing a 3D model of a test machine or structure
- *Animating* deflection shapes (**ODS**'s, mode shapes, or acoustic shapes), or displaying scalar engineering data using color contours
- Creating an FEA model by attaching FEA Objects (FEA elements) to the geometric model

SDM & FEA commands use FEA Objects. FEA Objects are provided when the **VES-6000 & VES-8000** options are licensed in your software.

### Adding a Structure Model to a Project

There are several ways to add a structure model to a Project;

- Execute File | Import | Structure, and *import* the model from an external source such as a CAD program or spreadsheet file
- *Double-Click* on a Structure (STR) file in the (*right or lower*) pane of the Current Project Fly-out Panel
- *Right Click* on a Structure (STR) file in the (*right or lower*) pane of the Current Project Fly-out Panel and select **Open** from the menu

### Creating a New Model

• Execute File | New | Structure in the MEscope window, and create the model using the drawing tools in the new Structure window.



Structure Window in Quad View.

# Data Block (BLK) Window

A Data Block (**BLK**) file contains one or more *time* or *frequency* domain measurements (**M**#s). An **M**# is a trace of uniformly sampled time or frequency data.

- All **M**#s in a Data Block have the same time or frequency axis values
- Each **M**# has a *unique measurement number* (**M**#), based in its *row* in the **M**#s spreadsheet

*Time-based* or *frequency-based* **ODS**'s, mode shapes, acoustic shapes, or engineering data shapes are interactively displayed on the structure model in a *connected* Structure window, using measurement values at the *cursor position* in a Data Block window

### Adding a Data Block to a Project

There are several ways to add a Data Block to a Project.

- Execute File | Import | Data Block and import measurements from a third-party data file
- *Double-Click* on a Data Block (**BLK**) file in another Project, listed in the (*right or lower*) pane of the Current Project Fly-out Panel
- *Right Click* on a Data Block (**BLK**) file in another Project, listed in the (*right or lower*) pane of the Project Fly-out Pane, and select **Open** from the menu

There are several ways to create a new Data Block in a Project.

- Execute File | New | Data Block in the MEscope window and create a Data Block with synthesized time waveforms in it
- Use an Acquisition window to *acquire* measurements from a *third-party* acquisition front end, and save them into a Data Block



Data Block Window Showing Four M#s in Row Column Format.

# Shape Table (SHP) Window

A Shape Table (SHP) file contains multiple *time-based* or *frequency-based* ODS's, mode shapes, acoustic shapes, or engineering data shapes

- A *"shape"* is defined as any data from *two or more* measurements made at different points & directions on a test article.
- Each shape can be displayed in animation directly from a Shape Table, on the structure model in a *connected* Structure window.
- Each shape has one or more shape components, defined in the M#s spreadsheet

• Each shape component has a *unique measurement number* (M#), defined by its *row* in the M#s spreadsheet

### Creating a Shape Table

A Shape Table (SHP) file can be created in several different ways,

- By saving shapes from a Data Block window during animation or curve fitting
- By saving shapes from an SDM or FEA calculation
- By saving shapes from a Sinusoidal ODS calculation in a Data Block or Shape Table
- By executing File | New | Shape Table and manually entering data into the empty Shape Table

### Adding a Shape Table to a Project

There are several ways to add an existing Shape Table (SHP) file to a Project

- Execute File | Import | Shape Table and import shapes from a *third-party data file*
- *Double-Click* on a Shape Table (SHP) file in another Project, listed in the (*right or lower*) pane of the Current Project Fly-out Panel
- *Right Click* on a Shape Table (SHP) file in another Project, listed in the (*right or lower*) pane of the Current Project Fly-out Panel, and select Open from the menu

SHP. Mode Shapes																																		
Shape	Shapes																																	
Select Frequency Damping Units Damping (%)																																		
1	164.9	3.085	Hz	<ul> <li>1.87</li> </ul>																														
2	224.4	6.572	Hz	~ 2.928																														
3	347.5	5.156	Hz	<ul> <li>1.484</li> </ul>																														
4	461.4	10.73	Hz	~ 2.324																														
5	492.8	4.597	Hz	<ul> <li>0.9329</li> </ul>																														
6	635.1	14.22	Hz	<ul> <li>2.238</li> </ul>																														
7	1108	4.964	Hz	<ul> <li>0.4479</li> </ul>																														
8	1210	7.124	Hz	<ul> <li>0.5885</li> </ul>																														
9	1323	7.251	Hz	<ul> <li>0.5482</li> </ul>																														
10	1555	17.33	Hz	<ul> <li>1.115</li> </ul>																														
M#s	M#s																																	
Select	lect		. Measur		Measurement		1	Shape 2		Shape 3		Shape 4		Shape 5		Shape 6		Shape 7		Shape 8		Shape 9		Shape 10		~								
M#	DOFs	DOFs Units		Units	Units	Units	Units	s Units	-s Units	Units		Туре		Magnitude	Phase	Magnitude	Phase	Magnitude	Phase	Magnitude	Phase	Magnitude	Phase	Magnitude	Phase	Magnitude	Phase	Magnitude	Phase	Magnitude	Phase	Magnitude	Phase	
M#1	1X:-15Z	g/lbf-sec	~	Residue Mode	Shape 🗸 🗸	101	13.75	269.4	17.74	56.85	8.208	78.81	12.94	297.5	192.9	142.2	206.7	833.7	206.5	235.3	190.6	458.7	197.7	280.3	204.5									
M#2	1Y:-15Z	g/lbf-sec	~	Residue Mode	Shape 🗸 🗸	97.61	196.1	7.006	358.5	64.46	44.68	131.1	337.8	1142	11.51	16.84	46.61	158.3	4.09	1649	196.8	120.8	10.93	53.63	332.2									
M#3	1Z:-15Z	g/lbf-sec	~	Residue Mode	Shape 🗸 🗸	133.3	196.4	87.02	202.5	35.89	122.6	43.12	334.7	1121	12.55	687.6	14.59	862.4	24.66	899.1	200.7	478.4	15.65	462	188.2									
M#4	2X:-15Z	g/lbf-sec	~	Residue Mode	Shape 🗸 🗸	93.81	7.653	252.8	12.37	82.71	6.581	78.44	7.421	223.4	192.1	59.31	215.8	995.4	189.6	513.1	184.8	202.2	187	317	183.3									
M#5	2Y:-15Z	g/lbf-sec	~	Residue Mode	Shape 🗸 🗸	36.73	190.5	7.496	57.39	41.68	154.5	80.35	342.6	774.4	11.5	17.86	94.03	742	13.7	836.9	186.8	43.55	59.33	43.01	160.7									
M#6	2Z:-15Z	g/lbf-sec	~	Residue Mode	Shape 🛛 🗸	194.5	195.1	238.2	204.5	519.9	190.6	625.2	186.6	543.8	12.86	155.3	159.9	5544	14.09	3408	9.916	1592	9.405	1336	22.58									
M#7	3X:-15Z	g/lbf-sec	~	Residue Mode	Shape 🗸 🗸	80	5.688	209.9	7.706	48.49	356.9	65.57	187.3	205.4	194.4	199.4	190.1	428.3	11.49	666	3.602	324.6	18.14	482.7	17.29									
M#8	3Y:-15Z	g/lbf-sec	~	Residue Mode	Shape 🗸 🗸	44.97	6.987	4.548	123.7	181	187.6	15.27	188.9	170.5	15.91	61.56	170.2	1132	7.525	484.9	359.4	23.94	208.6	22.91	305.1									
M#9	3Z:-15Z	g/lbf-sec	~	Residue Mode	Shape 🗸 🗸	192.6	193.1	149.7	199.2	1132	190.5	966.7	182.7	524.7	185.7	989.9	181.8	6331	8.812	5343	1.691	54.58	166	436.9	11.11									
M#1	0 4X:-15Z	g/lbf-sec	$\sim$	Residue Mode	Shape 🗸 🗸	93.04	10.13	205	7.8	27.87	8.777	155.4	179.5	260.2	182.2	409	174	1168	23.57	1734	8.162	375.9	183.5	93.81	185.4									
M#1	1 4Y:-15Z	g/lbf-sec	$\sim$	Residue Mode	Shape 🗸 🗸	141.1	8.373	18.34	71.35	305.2	189.9	14.93	95.85	412.7	181.6	31.25	65.27	139.8	209.7	163.7	0.4342	194	195.3	282.7	204.7									
M#1	2 4Z:-15Z	g/lbf-sec	$\sim$	Residue Mode	Shape 🗸 🗸	195.2	188.1	103.9	12.05	1691	189.8	201.9	178	1525	181.9	379.2	169.5	561.2	207.2	219.4	355.4	1653	185.5	1624	188.5									
M#1	3 5X:-15Z	g/lbf-sec	~	Residue Mode	Shape 🗸	91.04	10.88	200.4	9.336	6.389	276.2	166.6	185.3	332.1	181.1	465.4	179.6	787.2	0.3398	1267	355	685.4	187.2	474.6	188.7									
M#1-	4 5Y:-15Z	g/lbf-sec	~	Residue Mode	Shape 🗸 🗸	217.8	9.114	15.75	43.21	381.5	192	41.15	355.3	878.5	180.1	60.17	31.24	1337	175.7	346	168.4	108.7	195	180.5	196.3									
M#1	5 5Z:-15Z	g/lbf-sec	~	Residue Mode	Shape 🗸	218.5	195.6	309.2	2.887	2016	190.1	974.9	359.7	2070	179.4	1088	2.347	7391	178.4	5663	174.7	972.1	7.883	638.1	9.298									
M#1	6 6X:-15Z	g/lbf-sec	~	Residue Mode	Shape 🗸	3.111	13.19	199.9	6.418	0.9734	134	184.7	184.1	8.342	199	488.4	179.2	74.88	211.7	66.17	194	710.8	173.9	491	171.2									
1				A 11 14 1	~	004.0	C 007	10.00		077.0	202.0	405.0	400.0	005.0	100.1				100.1	100			1000	210.0	10.0									

Shape Table Containing Mode Shapes.

# Modal Demos

- *Click* on the **Modal** tab to display the **Modal** demo projects fly-out panel as shown below
- Move the mouse pointer over one of the Modal Analysis demos, and Double-Click to open its Project

Modal	
Gearbox Housing Modal Demo (2:20 PM, 4/28/2023)	

Modal Demos Tab with Mouse Over Gould Pump Demo

- Double-Click on the Gearbox Housing Modal Demo to open its project file
- Press Hotkey 1

**Sweep** animation will begin displaying mode shapes from the Shape Table on the right. The Shape Table has 14 mode shapes in it. Each mode shape has **2067 DOFs**.

### **Changing the Animation Speed**

The animation may be too fast or too slow, depending on the speed of your computer.

- *Click* in the Structure **STR** window to make it *active*
- Locate the Animate | Speed | Increase Speed (*rabbit*) and Animate | Speed | Decrease Speed (*turtle*) Tools
- *Click* on the **Turtle** Tool to *decrease* the animation speed
- *Click* on the **Rabbit** Tool to *increase* the speed

STR: Gearbox Housing - 3D View, - [Sweep] SHP: Mode Shapes		SHP: Mode S	napes						
3D View SHP: Mode Shapes		Shapes							
Persp: 40 Freq: 814.26 Hz, Damp: 0.31458% Complex Shape Speed: 35 Amo: 20		Select Fr Shape (i	equency Da	mping	Units	Damping (%)			^
		1	28.224	.104	Hz 🗸	7.4342			
		2	38.991 1	.9086	Hz 🗸	4.8891			
		3	75.021 6	1068	Hz ~	8.1132			
		4	193.68 2	.0684	Hz 🗸	1.0679			
		5	426.2 1	.8839	Hz ~	0.44202			
		6	460.23 3	.5574	Hz ~	0.77294			
A state - it also		7	814.26 2	.5615	Hz ~	0.31458			
		8	1030.1 2	.1185	Hz	0.20566			
		9	1091.9 1	.0/1/	HZ V	0.10467			
		11	1212.1 2	0704		0.16407			
		12	1469.6 4	7523	Hz V	0.32338			
		13	1576.1 1	.8172	Hz v	0.1153			~
		M#s							-
		Select				Measur	ement		<b>^</b>
		M#	DOFs		Units	Тур	e	Label	Mac
		M#1	1X:10000Z	(m/:	s)/N-sec	V RES SH	IP 🗸	GOP:SOP	0.0
		M#2	1Y:10000Z	(m/s	s)/N-sec	✓ RES SH	IP ~	GOP:SOP	0.00
		M#3	1Z:10000Z	(m/:	;)/N-sec	✓ RES SH	IP ~	GOP:SOP	0.0
		M#4	2X:10000Z	(m/:	;)/N-sec	✓ RES SH	IP ~	GOP:SOP	0.0
		M#5	2Y:10000Z	(m/s	s)/N-sec	✓ RES SH	IP ~	GOP:SOP	0.00
A Date		M#6	2Z:10000Z	(m/s	s)/N-sec	✓ RES SH	IP ~	GOP:SOP	0.0
		M#7	3X:10000Z	(m/s	s)/N-sec	V RES SH	IP V	GOP:SOP	0.0
15U-	z	M#8	3Y:10000Z	(m/s	i)/N-sec	RES SH		GOP:SOP	0.00
	ter Y	M#9	5Z:100002	(m/s	s)/IN-sec	RES SH		GOPSOP	0.0
	×	<	47:100002	(m/s	J/TV=SEC	KES SP	ur 🗸	GOP:SUP	>

Gearbox Housing Modal Demo Showing Sweep Animation.

### Quad View versus Single View

The Structure window can display a single View of the structure model, or four Views together in a Quad View format.

- 3D View (upper right quadrant) •
- Z Axis View (upper left quadrant) •
- X Axis View (lower left quadrant) •
- Y Axis View (lower right quadrant)

To change between the Quad View and one of the four Views,

- **Double-**Click on a single View in the **Quad View** to display that View
- **Double-**Click on the single View to display the **Quad View**

When the Vertical Axis is changed on the Display tab in the File | Structure Options box, the labeling of the three 2D Views will also change.

### Active View

When the Structure window is in Quad View, the *active View* is indicated by the yellow box in the Display | View button.

• **Double-**Click on a View to make it *active* 

When the 3D View is *active* the **upper right quadrant** of the **Display** | **View** button is yellow



In Quad View, *Double-Click* on each View to make it the *active View* and turn it yellow on the Display View Tool

Zoom

*Click* in a View to make it *active* and *spin the mouse wheel* to Zoom the structure in that View •

Pan

• Hold down the Ctrl key on the computer keyboard and drag the mouse pointer to Pan the structure model in the active View

### Rotate the Model in the 3D View

Hold down the Right mouse button and drag the mouse pointer in the 3D View to rotate the 3D model •

### **Geometric Interpolation**

The Animate | Use Interpolated Links command in the STR window is used to enable and disable animation of the *un-measured* **DOFs** on the test article using *Geometrically Interpolated* M# Links.

- The mode shapes contain 2067 measured DOFs of the Gearbox Housing which are deflected during animation using the Measured Links of the model in the STR window
- The remaining un-measured DOFs of the Gearbox Housing are deflected during animation using the • Interpolated Links of the model

When Animate | Use Interpolated Links is un-checked, only the Measured Links are used to create the 3D deflection of 689 measurement Points on the model, using the 2068 DOFs of mode shape data in Shape Table on the right.

When Animate | Use Interpolated Links is checked, the Interpolates Links are used to create the 3D deflection of all the other *un-measured* **DOFs** on the model using the **2068 DOFs** of mode shape in Shape Table on the right.

### Rotating the Model in the 3D View

- Return the Structure window to the **3D View**
- Press Hotkey 2

### **Removing Photographs from the Surfaces**

To alternately display of the model between a photorealistic model and the surface beneath it,

• Toggle Hotkey 3



Surface Model Showing Labeled Test Points

# **Displaying Test Point Labels**

To display the test point labels on the model,

• Toggle Hotkey 4

# **ODS Demos**

- Click on the ODS tab to display the ODS demo projects fly-out pane, a shown below
- Move the mouse pointer over one of the ODS demos, and Double-Click to open its Project

ODS	
Example 2 Constraints of the second s	

ODS Demos Tab with Mouse Over Jim Beam ODS Demo

- **Double-***Click* on the **Jim Beam Demo** to open its project file
- Press Hotkey 1



Dwell Animation at a Resonance Peak.

### Animating the ODS at a Resonant Frequency

*Peaks* in an **FRF** measurement are evidence of structural resonances, or modes of vibration. At or near a resonance peak, the **ODS** (*values of the FRFs*) *is dominated by the mode shape* associated with that resonance. For lightly damped structures, the **ODS** at or near a resonant frequency will *closely approximate a mode shape*.

### **Display Formats**

Notice the **ODS** at **460 Hz** has a lot of *"complexity"* in it, which causes the **ODS** to *"roll around"* as it is being deflected. This is because the data from the resonance at **492 Hz** is heavily influencing the data at **460 Hz**.

One way to remove the complexity of the **ODS** is to display the **FRF** data in **Imaginary** format. In **Imaginary** format, the resonance peaks are sharp and have influence on neighboring resonance peaks.



### • Right-Click on the FRF s and execute Format | Imaginary in the Data Block window

ODS from the Imaginary Peaks in the FRF s.

### Normalize Shapes

Another way to remove the "complexity" from the ODS's is to *normalize* them. Shape normalization changes the phases of an ODS so that all its components are **either 0 or 180 degrees** from each other. When it is normalized, it will display as a "*standing wave*" during animation.

- Toggle Hotkey 4
- Click near the 460 Hz resonance peak in the FRFs to display the 460 Hz ODS

Now when the **ODS** at **460 Hz** will display as a "standing wave" and will look like the mode shape at 460 Hz.

### Magnitudes & Phases of the ODS

Each **ODS** is **complex valued**, meaning that each shape component has both *magnitude and phase*. To display the magnitude and phase of the **ODS** at several points on the Jim Beam

- Press Hotkey 5
- Drag the mouse pointer to each of the resonance peaks in the FRFs

Notice that when **shape normalization** is *enabled*, all the **ODS** phases are 0 or 180 degrees from each other. When *shape normalization* is *disabled*, the **ODS** phases exhibit the *"complexity"* of the **ODS**.



ODS with Shape Normalization Enabled

### Video ODS Demos

- Click on the Video ODS tab to display the Video ODS demos fly-out panel as shown below
- Move the mouse pointer over one of the Video ODS demos, and Double-Click to open its Project



Video ODS Tab with Mouse Over Video ODS Fan Motor

- **Double-***Click* on **Video ODS Fan Motor** to open its project file
- Press Hotkey 1

### Sweep Animation from TWFs

Sweep animation from a Data Block of **TWFs** will begin. The **time-based ODS** at the **line cursor position** at each sample in the **TWFs** is displayed on a frame of the video corresponding to each sample of the **TWF** data. **7000 TWFs** were extracted from the video recording of a motor and fan during operation.



Sweep Animation of the ODS from TWFs of the Motor and Fan.

# **Dwell Animation from DFTs**

Sinusoidal dwell animation will begin. The **frequency-based ODS** at the **line cursor position** in the **DFTs** is displayed on a frame of the video. The **DFTs** were calculated from the **TWFs** that were extracted from a video that was recording of a motor and fan during operation.



Dwell Animation of the ODS from DFTs of the Motor and Fan.

### **Point Labels**

### • Toggle Hotkey 4

To deflect the ODS data in animation, each video frame is attached to a rectangular grid of Points. Each Point is deformed with **ODS** data in in the **X & Y** directions.

### **ODS Magnitude & Phase**

• Toggle Hotkey 5

The magnitude & phase of the complex valued **ODS** data is displayed at several Points on the Point grid.

### **ODS** Orbits

• Toggle Hotkey 6

The complex ODS data is displayed as orbits at several Points on the Point grid.

### **ODS Vectors**

• Toggle Hotkey 7

The complex ODS data is displayed as vectors at several Points on the Point grid.

# **Documentation with Videos**

MEscope allows you to interactively record a video of the contents of a Structure (STR) window or the MEscope window.

A video is a sequence of animation frames saved into a video **mp4** file. A Video can be played back on any computer that can play an **mp4** file

You can send videos to your clients, and they can view the animation just as it appears in MEscope. Videos can also be embedded in Microsoft *Power Point* presentations or *Word* documents. Individual frames can be cut from a video and pasted into documents, or annotations added to frames with a graphics or text processor.

# Videos Menu

The commands in the **Videos** menu are used to record two different types of videos, Animation Frames or the entire MEscope window.

Each video is saved as a MP4 file.

### Videos | Animation Frames

Records the animation frames in the active Structure (**STR**) window. When this command is executed, the **Record Video** dialog box will open, as shown below.

- *Press* the **Start** button to start recording a video
- Press the Stop button to finish recording the video, and open it in your attached Windows MP4 player

While a video is being recorded, you can change the 3D View Rotation, Zoom, Pan, display Points, Lines, Surfaces, etc.

The Videos tab in the File | Structure Options box contains controls for video Quality and Frames per Second.



Record Video Dialog Box.

### **Record Video Commands**

### Use Window Width and Height

If *checked*, the video will be the size of the graphics area, either the Structure (STR) window or the Work Area.

• If *un-checked* the Width and Height can be entered their respective boxes

### Stop After Full Cycles of Animation

If *checked*, video recording will stop after (N) animation cycles are completed.

# Restart Dwell Cycle or Time Sweep

If *checked*, video recording will start at the beginning of an animation dwell cycle.

### Videos / Record

Records a screen capture of the MEscope window.

- Press Record to start a screen capture of the MEscope window
- Press Record again to stop recording a video