



Altair

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**HyperWorks**

Altair HyperWorks Desktop 2019 Tutorials

HWD-0010: HyperWorks Desktop Environment

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## HWD-0010: HyperWorks Desktop Environment

This tutorial contains:

- Elements of the graphical user interface (GUI) features
- Page and window controls
- HyperWorks Desktop files

### Introduction

HyperWorks Desktop belongs to the HyperWorks software suite and consists of the following applications. A brief description of each product in HyperWorks Desktop is included under the Select application Menu topic. For more detailed information on a product listed below, refer to the product's help manual.

- HyperMesh
- MotionView
- HyperView
- HyperGraph
- HyperGraph 3D
- MediaView
- TextView
- TableView
- Templex and Math Reference

While MotionView allows you to create and set up an analysis for multi-body systems, the remaining applications provide an interactive and easy to use environment for the visualization, plotting, study, analysis, and presentation of engineering result data obtained from finite element analysis (FEA) or multi-body dynamics (MBD) solvers.

## Elements of the Graphics Interface

The main elements of the HyperWorks Desktop graphics interface are described below.

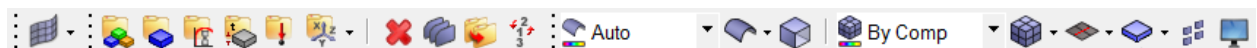
<b>Title bar</b>	The title bar tells you which product is active. Because you can switch between clients, clicking on and activating a different window may change the information in the title bar. The title bar also tells you the name of the file currently loaded.  In HyperMesh, the name of the active loaded user profile is also shown.
<b>Menu bar</b>	Windows style pull-down menus that allow you to access the HyperWorks Desktop functions and tools are located along the top of the screen. The top-level menu choices vary, based on the active application in the current window.
<b>Toolbar</b>	Panels containing tools associated with the active application can be accessed using the toolbar buttons. Panels are also accessible from the menu bar. See <i>Select Application Menu</i> for the various toolbar types.
<b>Tab area</b>	The portion of the graphical user interface that contains the browsers, the utility menus for the solver interfacing user profiles, and other functionality not shown in the panel area. The Tab Area can be moved to either the left or right side of the graphics area, or both, or it can be hidden completely.
<b>Graphics area</b>	Models, plots, animations, and text are displayed in this area. It can be divided into multiple windows.
<b>Panel area</b>	Most operations are performed using the panel options.
<b>View controls</b>	Tools that control the orientation of the window display.
<b>Select application menu</b>	This menu allows you to change the active HyperWorks Desktop application in any window. The options are: HyperMesh, HyperView, HyperGraph, HyperGraph 3D, MediaView, TextView, MotionView. A description for each application is included below.
<b>Page and window controls</b>	These toolbar buttons allow you to control the page and window layout. See <b>Page and Window Controls</b> below for more information.

### Select application Menu

You can select one of the following applications from the **Select application** menu. Loading each application changes the toolbar and menu bar settings. The table below describes the purpose of each application and shows the changes in their corresponding tool bar.

#### HyperMesh

Analyze product design performance in a highly interactive and visual environment.



## HyperView

Visualize CAE results. Deformed, linear static, modal, and transient animations for finite element and multi-body analyses are supported.



## HyperGraph 2D

Analyze and plot data.



## HyperGraph 3D

Create and analyze 3-D plots.



## MotionView

Pre-process, post-process, and visualize mechanical system simulations, including industry-leading capabilities for flexbodies.



## MediaView

Read video files.



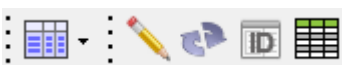
## TextView

View and edit text files. In this window, you can embed mathematical functions using the Templex language. Also, you can access xy data from a plot window and perform mathematical operations on it using Templex functions.



## TableView

Creates an Excel-like spreadsheet inside of HyperWorks Desktop. You can use Templex expressions inside of a cell to synchronize with HyperGraph and create summary tables that update accordingly using report templates. Value-dependent formatting allows for the easy detection of critical key point indicators (KPI's). Basic spreadsheet functionality to format and edit the table cells is also available.



## Page and Window Controls

The following buttons are displayed for all HyperWorks Desktop applications, and are used to manage pages, change page layouts, and manipulate individual windows:



Icon	Function	Description
	<b>Add Page</b>	Adds a new page to the session.
	<b>Delete Page</b>	Deletes a page from the session.
	<b>Page Layout</b>	Displays a pop-up menu containing 20 page layouts that can be applied to the displayed page.
	<b>Expand/Reduce Window</b>	In a multi-window display, use this feature to enlarge or reduce the selected window.
	<b>Swap Windows</b>	In a multi-window display, use this feature to rearrange window order.
	<b>Page counter</b>	Displays the current page number and the number of pages in the current session in the upper right corner of the screen. You can enter a page number directly to access that page. <b>Note</b> The page counter is located near the upper right side of the graphical user interface.
	<b>Next Page</b>	Browse forward through the pages. <b>Note</b> This arrow is located near the upper right side of the graphical user interface.
	<b>Previous Page</b>	Browse backward through the pages. <b>Note</b> This arrow is located near the upper right side of the graphical user interface.


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## View Controls

The view controls, located in the toolbar area of the panel, allow you to visually manipulate model graphics, plots, and videos. There are three view control toolbars in HyperWorks Desktop: **Standard Views**, **3D View Controls**, and **2D View Controls**. The toolbars can be turned on or off from the **View** menu. A check mark indicates that a toolbar is currently displayed. Clicking an item in the **Toolbars** sub-menu toggles the state between "on" and "off". Like the toolbar buttons, the view controls available vary based on the current application.

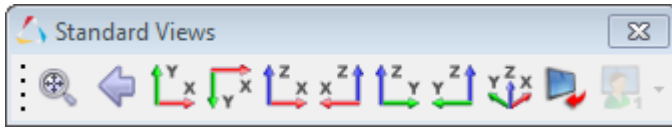
Toolbars can be moved and "docked" to any of several possible locations inside the user



environment. Each toolbar has a toolbar handle, , used to drag a toolbar on (docked) or off (undocked) a toolbar area. To move a toolbar, simply click-and-drag the handle to the new location that you wish the toolbar to reside.

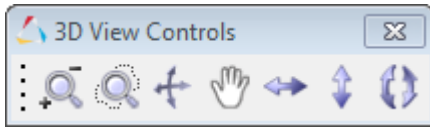
The tables below explain the functionality of the view control buttons in MotionView, HyperView, and HyperGraph:








The **Standard Views** toolbar provides shortcuts to commonly used viewing angles.



Function	Icon	Description
Fit Model		Left click: Fit model Right click: Fit all models
Previous View		
XY Top Plane View		Set the view to the xy top plane
XY Bottom Plane View		Set the view to the xy bottom plane
XZ Left Plane View		Set the view to the xz left plane
XZ Right Plane View		Set the view to the xz right plane
YZ Rear Plane View		Set the view to the yz rear plane
YZ Front Plane View		Set the view to the yz front view
Isometric view		Set the view to the isometric view
Reverse View		Set the view to the "reverse" of the current view
User views		Set/Retrieve the currently memorized user view

The **3D View Control** toolbar provides enhanced options when viewing models in 3D.



Function	Icon	Description
Zoom		Zoom in/out with a factor of 2x
Circle/Dynamic Zoom		Left click: Circle zoom mode Right click: Dynamic zoom mode
Dynamic Rotate/Spin		Left click: Dynamic rotate mode Right click: Dynamic spin mode
Pan		Left click: Pan mode Right click: Center model mode
Rotate Left/Right		Left click: Rotate left Right click: Rotate right
Rotate Up/Down		Left click: Rotate up Right click: Rotate down
Rotate clockwise/counter-clockwise		Left click: Rotate clockwise Right click: Rotate counter-clockwise



The **2D View Control** toolbar provides enhanced options when viewing models in 3D.



Function	Icon	Description
Fit		Fit all data within viewable graphics area
		Fit x data only within viewable graphics area
		Fit y data only within viewable graphics area
Zoom		Left click: Zoom in Right click: Zoom out
Pan horizontal		Left click: Pan left Right click: Pan right
Pan vertical		Left click: Pan up Right click: Pan down
Pan diagonal		Left click: Pan diagonal upper left Right click: Pan diagonal upper right
Pan diagonal		Left click: Pan diagonal lower left Right click: Pan diagonal lower right
Reverse view		Flip x and y data
User view		Set/Retrieve the currently memorized user view

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## HyperWorks Desktop Files

### Session File (MVW)

Each time a HyperWorks Desktop application is launched, a new session is started. Saving a session creates a session (MVW) file, which allows you to retain many of the actions you performed during the session. You can then close the session and restart it later without having to redo procedures. This file has an *.mvw* extension.

An MVW file is a plain text file that contains commands that were performed in the operations of the corresponding session. Results and model file data are *not* stored in this file. Rather, soft links point to the data files used in the session, helping to keep the MVW file size small. If you move the data files to a different folder, the MVW file will not be able to locate them unless you edit the file path names in the MVW file. It is suggested that you save the MVW file to the same folder that contains the data files. You can edit the MVW file using a text editor.

To save a session to a session file, select **Save Session File** from the **File** menu on the menu bar. To open the file, select **Open** from the **File** menu.

### Preference File

The preference file is a script file that is read each time a HyperWorks Desktop application is started. It specifies default user settings such as the window type, printer, page layout, the autosave interval, and the order in which colors are assigned.

A standard preference file for all HyperWorks Desktop applications exists in the installation directory and is read every time HyperView is started. On Windows, the file is named `preferences.mvw`, while on UNIX, it is named `.preferences.mvw`. An additional preference file can be created in your working folder that either overwrites the standard preference file or adds it to the existing settings in the standard preference file.

A set of seven include preference files are contained in the installation. These files are customized for each HyperWorks Desktop application. They are called from the standard preference file when a session is started and cannot be called independently. These files are located at `<installation directory>/hw/prefinc`. For more information see Preference File Location.

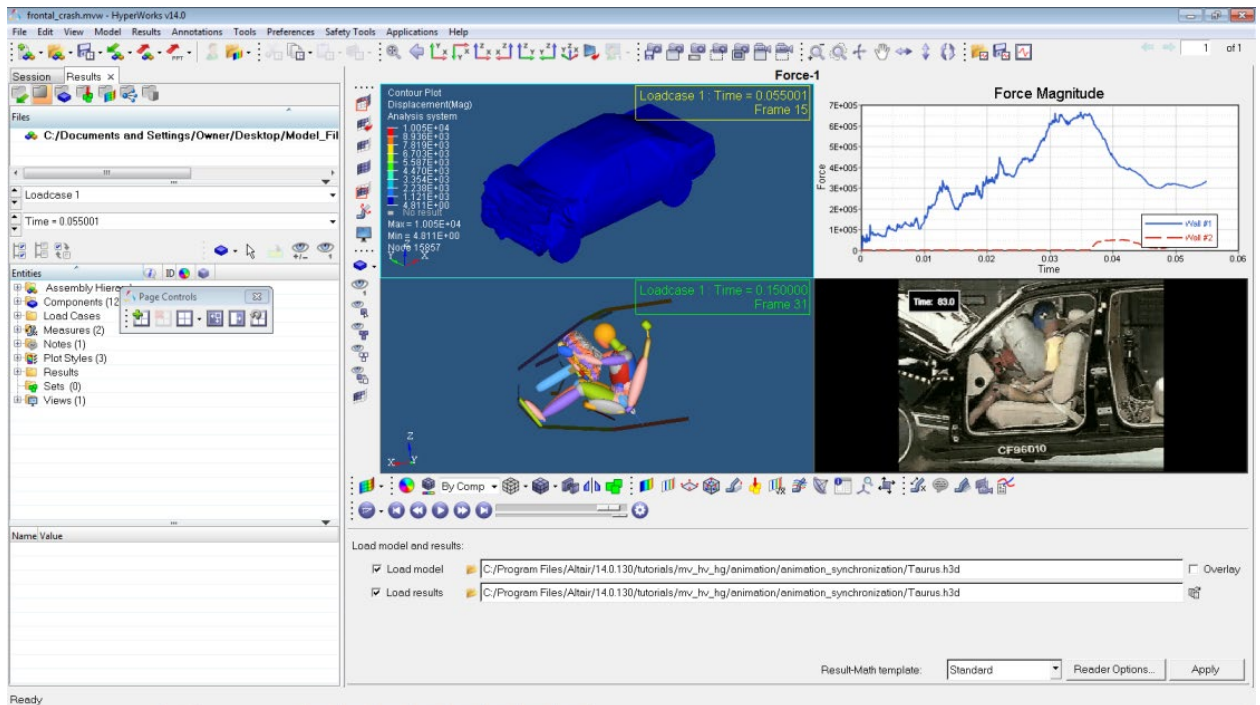
## Exercise: Learning to Use the HyperWorks Desktop Interface:

In this exercise, you will:

- Work with session files.
- Develop an understanding of the GUI.
- Use the page and window controls.


### Step 1: Open the session file `frontal_crash.mvw`.

1. From the **File** menu, select **Open > Session**.
2. Select the file `frontal_crash.mvw`, located in the `../tutorials/mv_hv_hg/animation` directory and click **Open**.





A HyperWorks Desktop page featuring multiple windows with different applications

## Step 2: Add pages and navigate between them using the Page controls.

1. Click the **Add Page** button, , to add a second page.

Observe the changes to the page counter.

2. Add one more page.

3. Click the icons, , , to navigate to the next page and previous page, respectively.









You can also enter the page directly in the page number field.



4. Go to page 1.

## Step 3: Using the Session Browser to rename a page and using the View menu to navigate between pages.

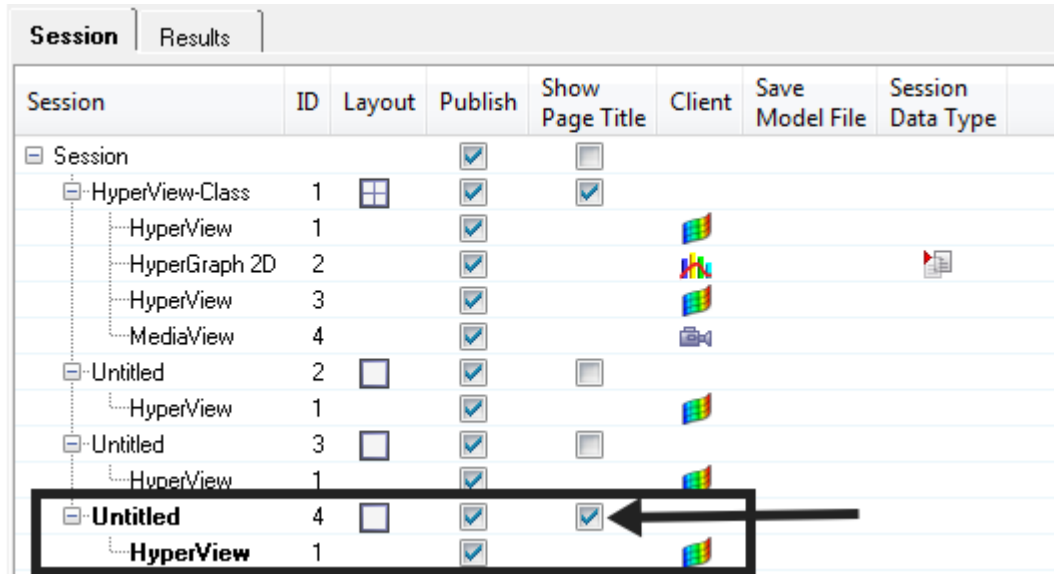
1. Click the **Session** tab.

Session	ID	Layout	Publish	Show Page Title	Client	Save Model File	Session Data Type
Session			<input checked="" type="checkbox"/>	<input type="checkbox"/>			
Force-1	1		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
HyperView	1						
HyperGraph 2D	2						
HyperView	3						
MediaView	4						
Untitled	2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
HyperView	1						
Untitled	3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
HyperView	1						

Session Browser

2. Right click on **Force-1** and select **Rename**.
3. Type `HyperView-Class`, to rename page 1.
4. Right click in the **Session Browser** and select **Create**. This adds a fourth page. The new page is displayed as **Untitled**.
5. Double-click the page in the **Session Browser** to switch to page 4.

- To display the name of page 4 at the top of its page, from the **View** menu, select the **Page > Title** or you can check the box for **Show Page Title** in the **Session Browser**.





Session	ID	Layout	Publish	Show Page Title	Client	Save Model File	Session Data Type
Session			<input checked="" type="checkbox"/>	<input type="checkbox"/>			
HyperView-Class	1		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
HyperView	1		<input checked="" type="checkbox"/>				
HyperGraph 2D	2		<input checked="" type="checkbox"/>				
HyperView	3		<input checked="" type="checkbox"/>				
MediaView	4		<input checked="" type="checkbox"/>				
Untitled	2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
HyperView	1		<input checked="" type="checkbox"/>				
Untitled	3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
HyperView	1		<input checked="" type="checkbox"/>				
<b>Untitled</b>	4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
HyperView	1		<input checked="" type="checkbox"/>				

- To display page 2, right click on **Untitled** (with the ID "2") in the **Session Browser** and select **Make Current**.

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#### Step 4: Use Page Layout to create a four-window layout.


1. Click the arrow next to the **Page Layout** button, , to display the **Page Layout** options.
2. Click the four-window layout, .

The border of the upper left window in the four-window layout is cyan to indicate it is the active window.

#### Step 5: Change the applications in windows 2-4 on page 2.

1. From page 2, click in the upper right window (window 2) to make it active. A cyan border is displayed around window 2, indicating that it is the active window on the page.
2. From the **Select application** menu, select **HyperGraph 2D** to change the window type for window 2 from animation to plot.  
The toolbar changes to reflect the plot window mode.
3. Activate window 3.
4. Change the window type for window 3 from **HyperView** to **MotionView**.
5. Click on window 4 to make it active.
6. Change the window type for window 4 from **HyperView** to **MediaView**.
7. Go to page 1.

#### Step 6: Use Swap Windows to change the order of windows on page 1.


1. Change the page to **page 1**.
2. Activate window 2 (plot window).
3. Click the **Swap Windows** button, .
4. Click on window 3 in the drop-down image.


The contents of windows 2 and 3 are exchanged.


When there are only two windows on a page and you click the **Swap Windows** button, the windows are automatically swapped.

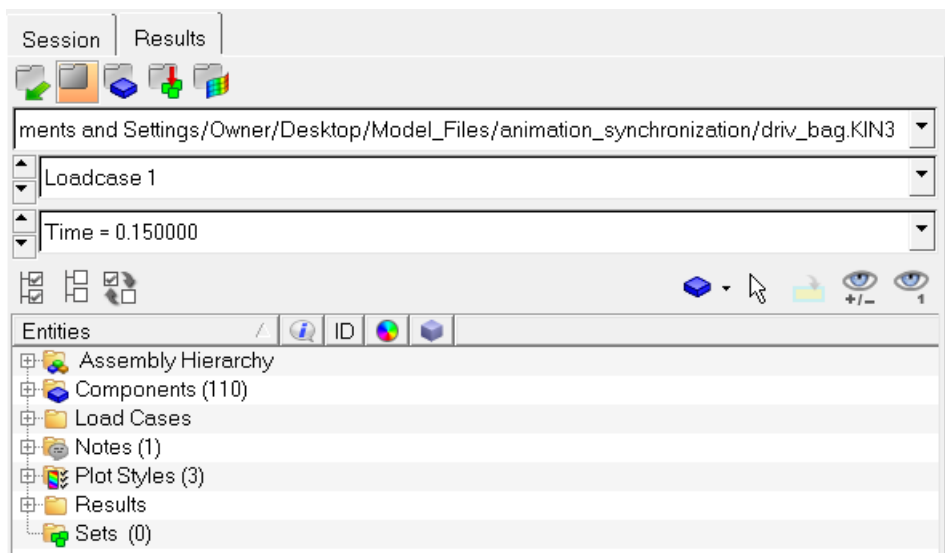
## Step 7: Expand window 2 to the graphics area.

Use the **Expand/Reduce Window** button to temporarily expand the HyperView window to fill the entire graphics area. This allows you to see a larger view of the model without changing the window layout.

1. Make window 2 (dummy model) active.
2. Click the **Expand/Reduce Window** button, .

The **Expand/Reduce Window** button changes to . This button acts as a toggle.






3. Click the button again to return to the original display.
4. From the tab area, click the **Results** tab.
5. Click the **Model view** icon, , to display the model properties.







## Step 8: Use the view controls.

1. From the **View** menu, select **Toolbars > HyperWorks > Standard Views** or **3D View Controls** to remove the checkbox next to the menu item and turn the toolbars off.
2. Turn the toolbars on again.



3. Dock the toolbars by selecting the toolbar handle, , and dropping it in the graphics area.
4. Click the bar again to display the view controls.
5. Use the  button to view the model in the YZ **Front Plane View**.
6. Rotate the model clockwise and counter clockwise by left and right clicking on .
7. Use the  and  buttons to rotate the model about the horizontal and vertical axis, respectively. The horizontal axis runs along the width of the screen, while the vertical axis runs along the height of the screen.

Each mouse-click rotates the model by 30 degrees.

8. Use  to zoom in and out. Left click to zoom in and right click to zoom out.
9. Use the  button to fit the model to the window.
10. Click  for a left-side view of the model.
11. Click  to change the view to Iso.
12. In the **Results Browser**, right click and select **Create > View**.  
This saves the current view so that it can be recalled in the future.
13. Rotate the model to a new position.
14. Expand the **Views** folder in the **Results Browser** and select the icon before **View 1**.  
This restores the saved view.

## Step 9: Save the session to a session file.

1. From the **File** menu, select **Save As > Session**.
2. Specify a path and the name `practice` for the MVW file and click **Save**.



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**Step 10: Clear the data from the session.**

1. From the **File** menu, select **New > Session**.
2. Answer **Yes** to the pop-up message "*This operation will discard current session file data. Continue?*".

**Step 11: Open the session file `practice.mvw`.**

1. Open the session file `practice.mvw` (See step 1).
2. Notice the contents of the session. It contains the number of pages and the window layouts you created in the previous steps of this exercise.

**Step 12 (Optional): Clear the data from the session.**

Now that the exercise is complete, you can clear the data from the HyperView session (see Step #10 above).