



Altair

HyperWorks

Altair HyperView 2019 Tutorials

HV-6020: Using Video Overlay

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HV-6020: Using Video Overlay

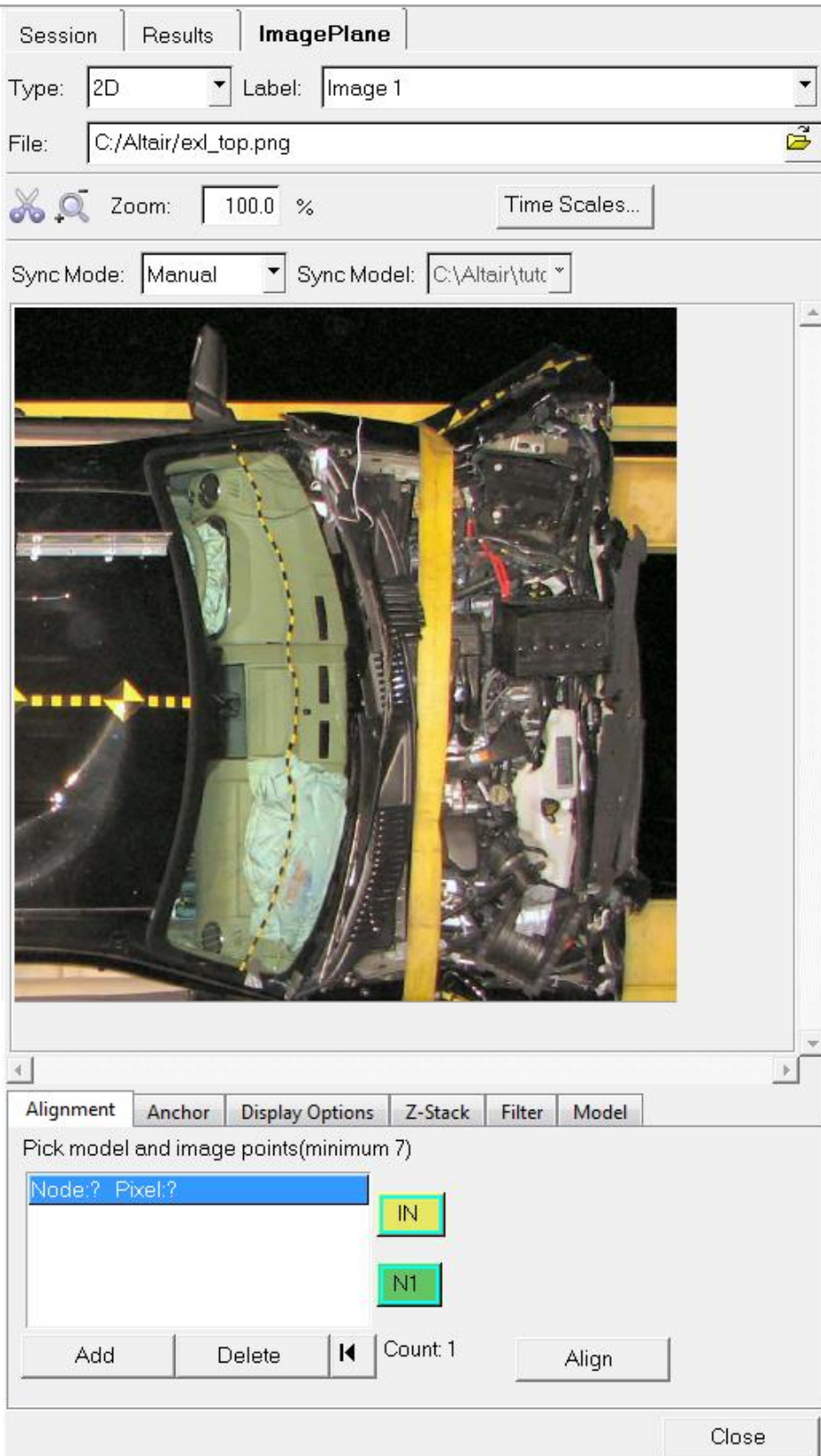
In this tutorial, you will learn how to:

- Import and edit an image
- Overlay the image on top of an animation file and play the animation
- Import a video as a 2D image
- Overlay the video with an animation file and play the animation
- Align a video using multiple point alignment or camera properties
- Import a video as a 3D image
- Rotate and animate the video and animation file together

Tools

To access the **Image Plane** panel:

- Click the **Image Plane** panel button on the **Annotations** toolbar .
- OR
- From the **Results Browser** right click and select **Create > Image Plane**.




The **Image Plane** panel allows you to import images and video files to the HyperView animation window. These images and videos can be edited and graphically placed in the animation window. They can also be imported as 2D images or 3D images which can be rotated in the graphics window just like a results file. The videos can be animated and synchronized to an animation file.



Exercise: Using the Image Plane panel

This exercise uses the `explorer.h3d` file as both the model and the results file.

Step 1: Import and edit an image, then animate the model.

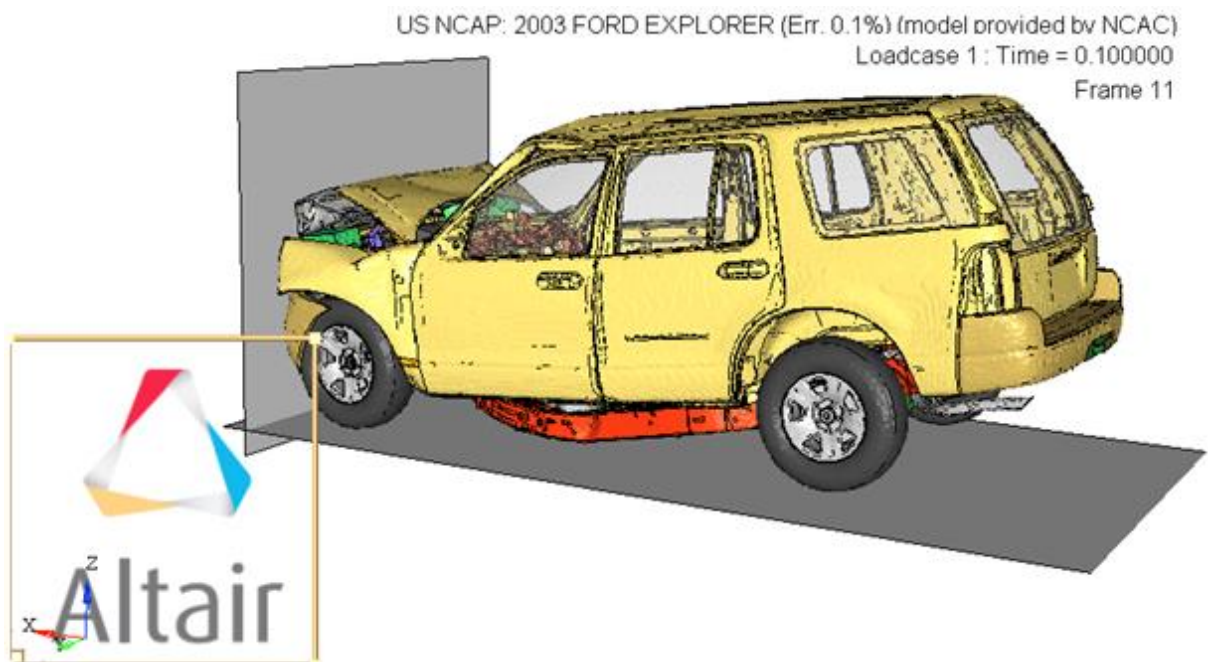
1. Load the `explorer.h3d` file, located in the `animation` folder.
2. Within the **Results Browser**, expand the **Section Cuts** folder and click on the  icon next to **Section 2**.

The display of the section cut for **Section 2** is turned off in the graphics area.

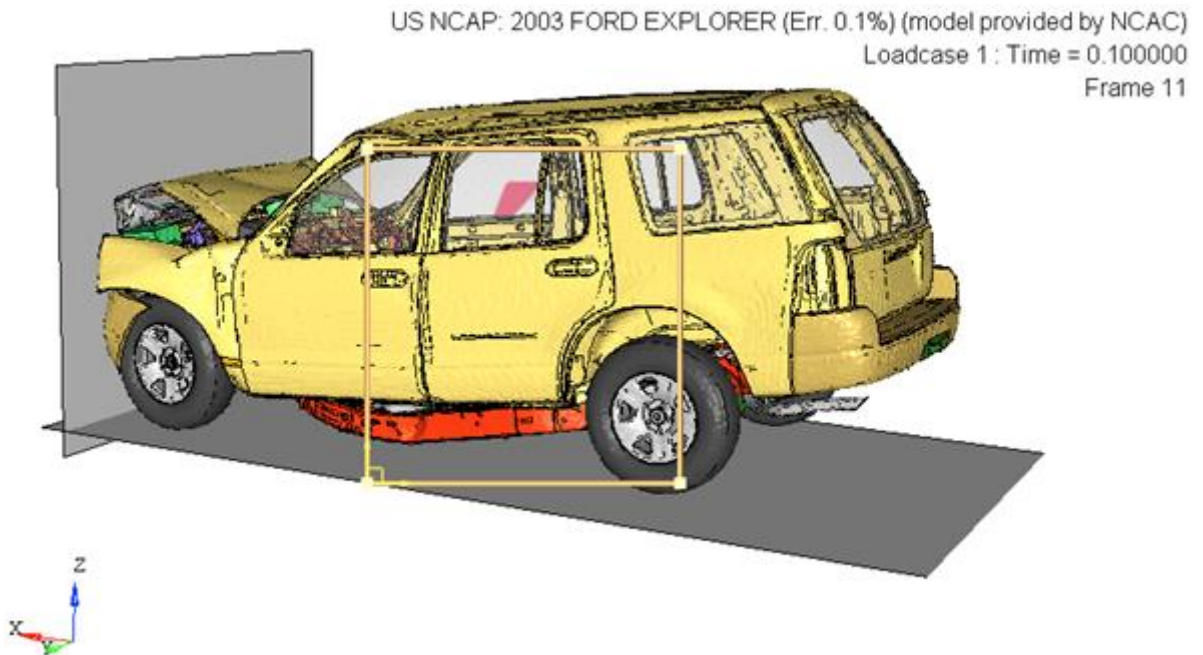
3. Click the **Image Plane** panel button  on the **Annotations** toolbar.
4. Use the drop-down menu to set the **Type:** to **2D**.
5. Enter `Altair` for the **Label**.
6. Click on the **Open File** icon  next to **File** and select the file `altair.png`.


The file is imported into the animation window. Notice the size of the image in the animation window.


7. To resize the image, click on any of the corners of the graphical manipulator and drag to the new desired location. Resize the image as shown below:

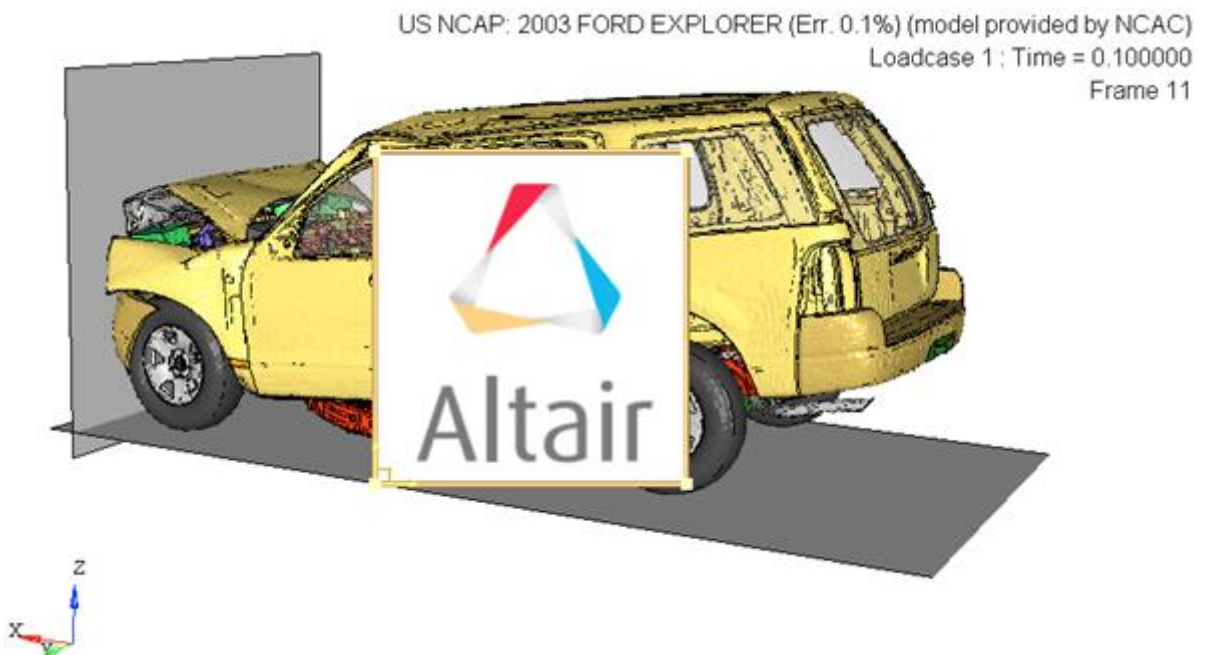


8. To move the image, use the graphical manipulator in the lower left corner of the image. Click on the horizontal axis to move the image horizontally, and click on the vertical axis to move vertically. Center the image in the graphics window as shown below:

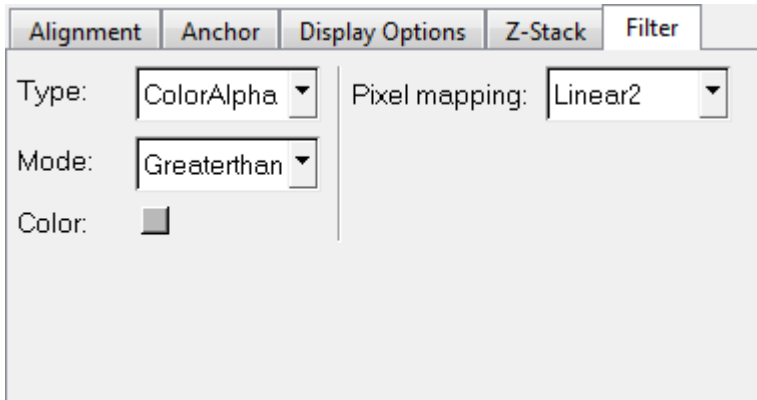


You can also place the image at the center of the animation window by clicking on the **Anchor** tab in the **Image Plane** panel and selecting the **Center** icon, .

9. Notice how the image cannot be seen because it lies under the animation. To bring the image to the front, click on the **Z-Stack** tab in the **Image Plane** panel and with the image label (**Altair**) highlighted, click the up arrow, .



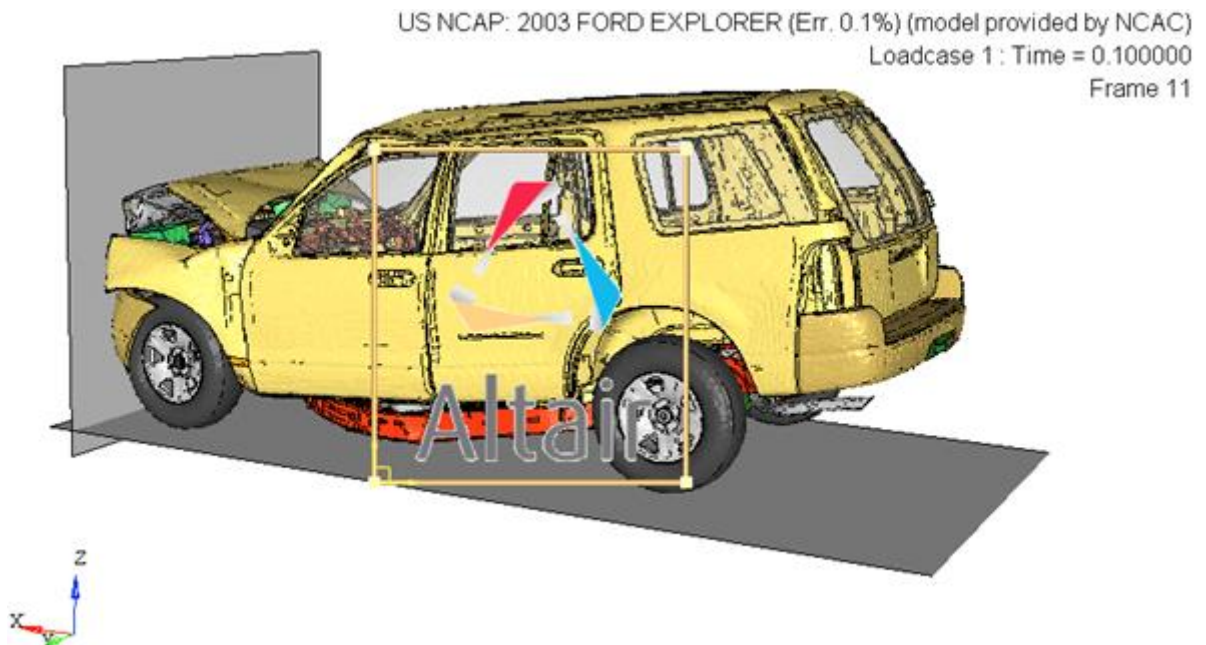
10. Click on the **Filter** tab. Using this tab, the color white will be removed from the image so that it has a transparent background.
 - Set the **Type** to **ColorAlpha**.
 - Set the **Pixel mapping** to **Linear2**.
 - Set the **Mode** to **Greaterthan**.
 - Click on the **Color** option and pick the gray color (just below white) from the color palette.



These settings remove the color white from the image.

11. Close the **Image Plane** panel by clicking on the **X** at the top of the tab.
12. Animate the model.

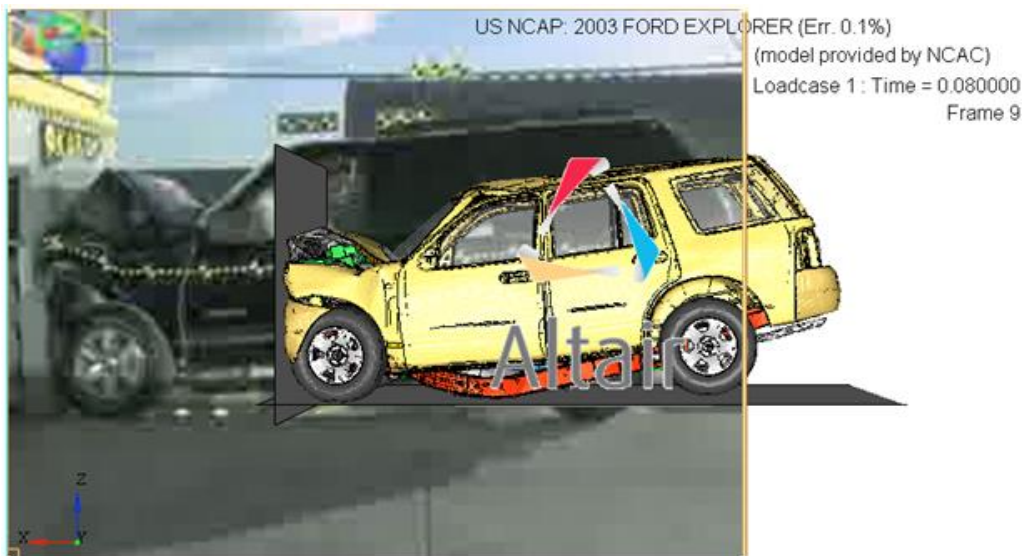
Notice how the model animates with the image placed on top of the model.



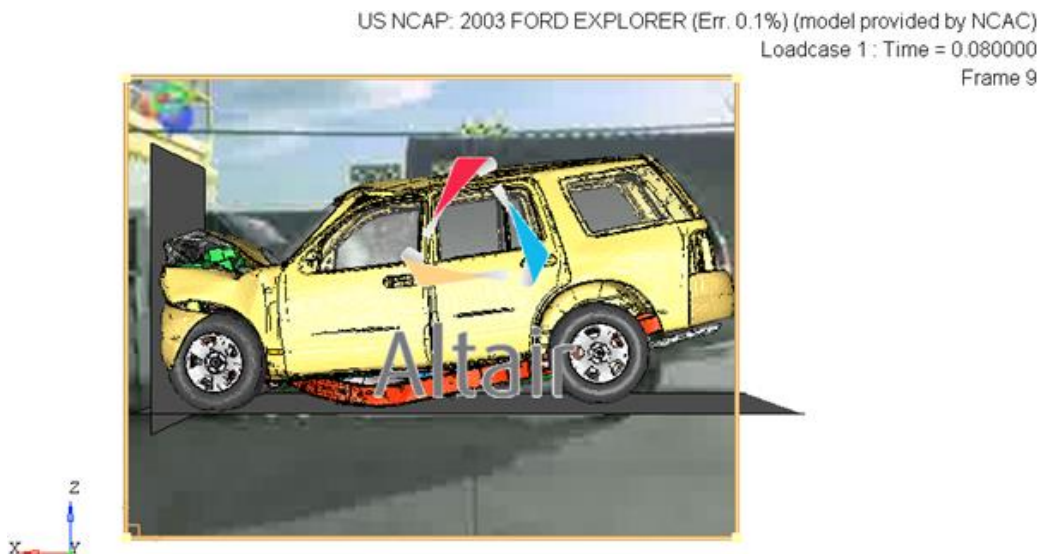
13. Stop the animation.

Step 2: Import a video and animate with model.

1. In the **Results Browser**, expand the **Image Planes** folder.
Notice that there is the image plane named **Altair** that we created in the previous step.
2. Right-click in the **Results Browser** and select **Create > Image Plane**.
3. Set the **Type:** to **2D**.
4. Enter Explorer for the **Label**.
5. Click on the **Open File** icon (next to **File**), select the file 06Explorer-f.avi, and click **Open**.
6. Select the **XZ Right Plane View** to align the h3d model and the avi file in the same plane.



7. Resize and move the image in the same manner as the altair.png file. Resize and move the image to match the size and location of the model.



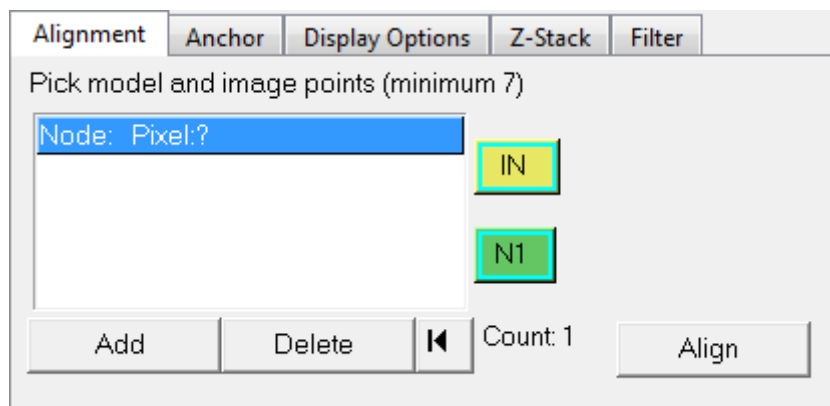
8. Animate the model.

Notice how the model animates with both the image placed on top of the model and the video in the background.

9. Stop the animation.

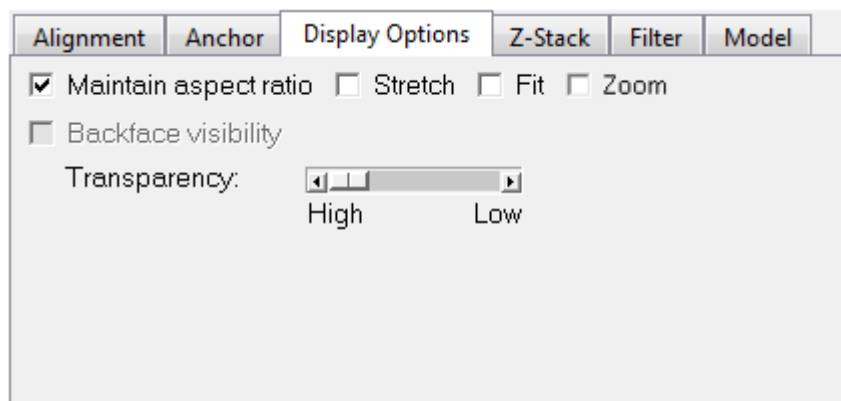
Step 3: Align a video using multiple point alignment or by entering camera properties.

1. From the **Image Plane** panel, click on the **Alignment** sub-tab. This sub-tab allows you to pick points on the image (in the image plane tab) and corresponding nodes on the model (in the graphics window).



The points on the image and the corresponding nodes on the model should be as close and accurate as possible, in order to optimize the alignment and scaling. A minimum of seven points/nodes are required, however for this exercise we will select a total of nine points/nodes.

Note To enable the easy picking of nodes on the model, please make the image in the graphics window completely transparent by using the slider bar in the **Display Options** tab (sliding to **High**), or turn off the display of the Image plane from the **Results** browser tab. **You can also adjust the color of the model, if necessary.**



2. A set of nine node-point pairs that provided a good alignment with a very low error value are shown in the images below. For the purpose of this exercise, please try and select your points and nodes as closely as possible to those on the images:



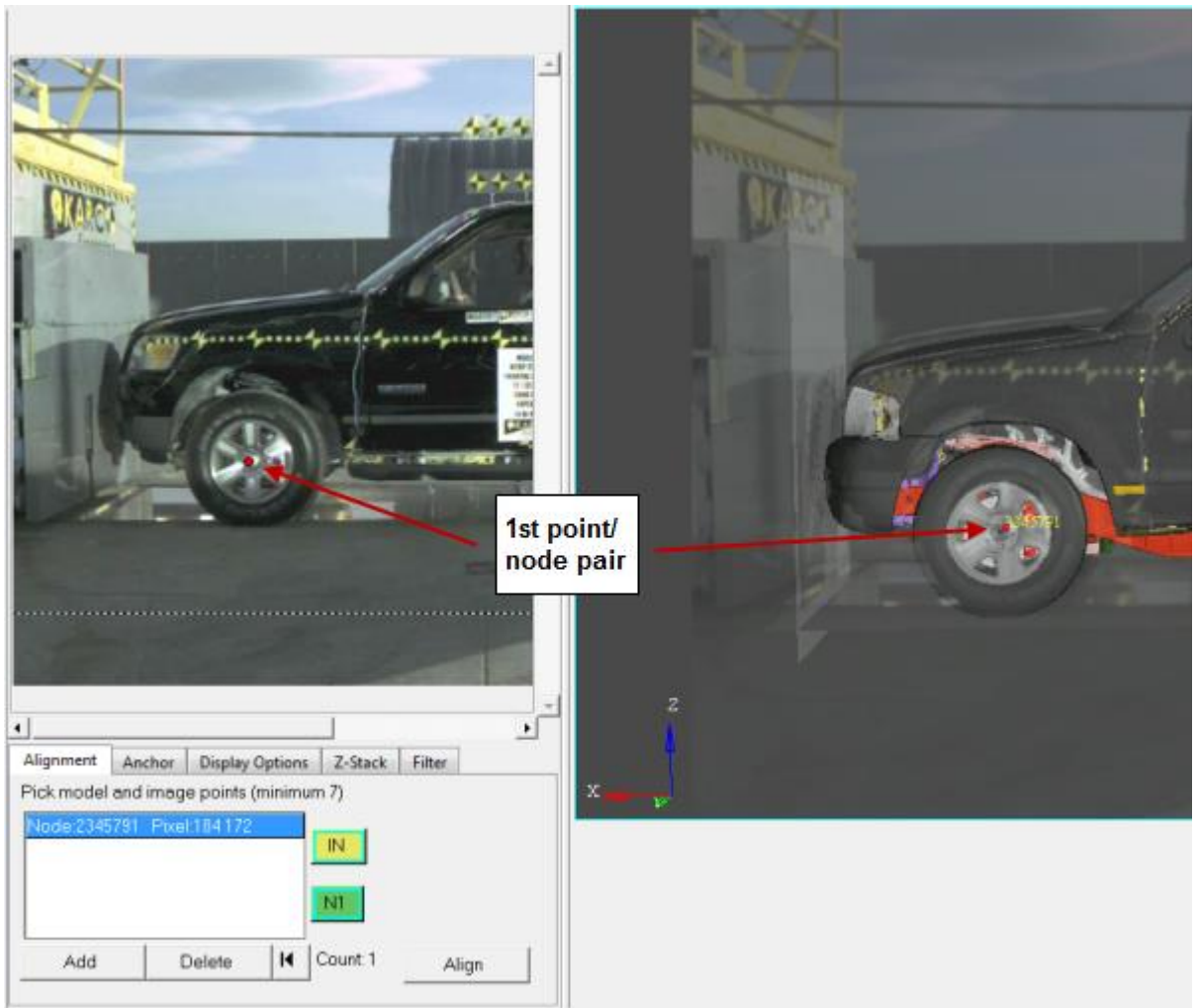
Image plane with 9 points selected



Model with 9 nodes selected

- Select the middle of the front wheel as the first point on the image (*Pixel: 184 172*).
- Next, select the middle of the front wheel as the first node on the model (*Node: #2345791*).

The **Alignment** tab is populated with the first point and node pair.



- Click the **Add** button and pick the second image point/node pair (Pixel: 606 178 Node: 2338497).
- Click the **Add** button again and continue this process to select the seven remaining point/node pairs (see the table below):

<i>Pixel: 131 253</i>	<i>Node: 2460819</i>
<i>Pixel: 117 173</i>	<i>Node: 2579302</i>
<i>Pixel: 430 362</i>	<i>Node: 2490332</i>
<i>Pixel: 257 302</i>	<i>Node: 2502038</i>
<i>Pixel: 526 360</i>	<i>Node: 2417448</i>
<i>Pixel: 400 174</i>	<i>Node: 2231375</i>
<i>Pixel: 523 188</i>	<i>Node: 2406298</i>

An **Error** measurement is displayed above the **Align** button as soon as the seventh point/node pair is picked. This measurement will then be updated as additional pairs are added. An increase in the error measurement indicates that the last pair that was picked is not ideal and it is recommended that a different pair be selected instead.

Note It is recommended that you select two points which lie on different depth levels. More points at different depths will create better alignment. Also, points located at the center area of the image/video are generally preferred than points near boundaries. Incremental adjustments to orientation can be performed with the help of graphical manipulators.

3. Click the **Align** button to scale and align the model and image plane.

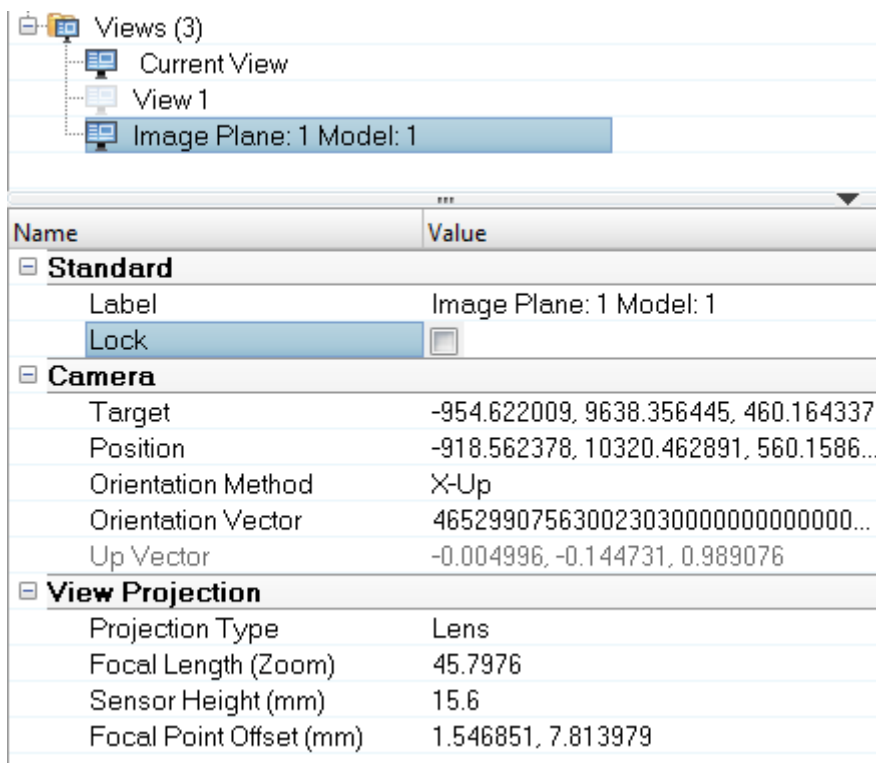
Note If the currently selected points have an error value greater than 75, an error message will display and will ask if you would still like to proceed. See the **Alignment** section of the **2D Image Planes** topic for additional information.

A new view is created in the **Views** entity folder in the **Result** browser named **ImagePlane1 Model1**.

4. For the purposes of better visibility and analyzing correlation, a few things can also be considered:
 - Adjust the transparency of the image plane using the **Display Options** tab.
 - Control the display order of the image planes and model using the **Z-Stack** tab. See the **Z-Stack** section of the **2D Image Planes** topic for additional information.
 - Apply a filter to the image using the **Filter** tab. See the **Filter** section of the **2D Image Planes** topic for additional information.
5. An alternate method for achieving alignment is also available. Go to the **Results** browser tab and click on the **ImagePlane Model1** view.

The **Entity Editor** is displayed at the bottom of the browser. You can use the **Entity Editor** to enter or modify the camera properties in the view. See the **Views** section of the **Entity Editor** topic for additional information.

- All user defined or image plane alignment generated views are locked by default. Unlock the **ImagePlane1 Model1** lens type view by unchecking the **Lock** box (located in the **Standard** section of the **Entity Editor**).




When a view is unlocked, it is also synchronized with the graphics window.

- Enter the camera properties for the view into the various fields located in the **Camera** section of the **Entity Editor**.
- Animate the model.
Notice how the model animates with both the image placed on top of the model and the video in the background.
- Stop the animation.

Step 4: Import a video as a 3D object and animate with the model.

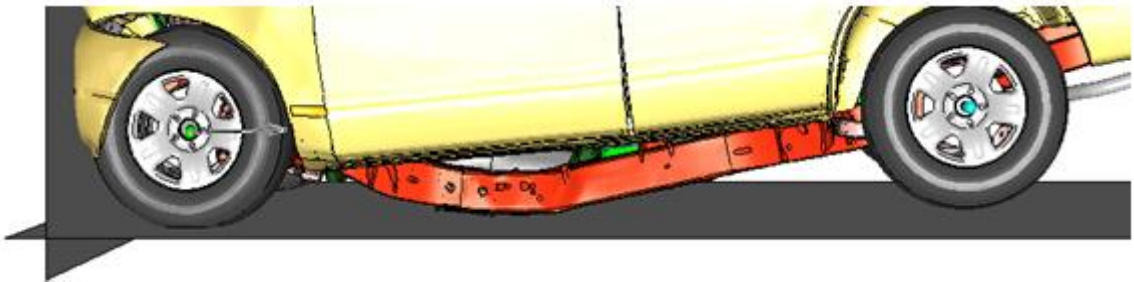
- In the **Results Browser**, expand the **Image Planes** folder.
- Turn off the display of the two image planes already created by selecting both **Altair** and **Explorer**, right clicking on them and selecting **Hide**.
- Right click in the **Results Browser** and select **Create > Image Plane**.
- Set the **Type:** to **3D**.
- Enter `Explorer Video` for the **Label**.
- Click on the **Open File** icon next to **File** and select the file `06Explorer-f.avi`.

7. Select the **XZ Right Plane View**  to align the h3d model and the avi file in the same plane.
8. In the **Image Plane** panel, verify that you are in the **Alignment** tab.
This tab will be used to align the model in the video file to the model file.
9. Set the **Alignment Mode** to **2 Point**.
10. Set the **Plane** to **XZ Right**.
11. The first set of reference nodes to be selected are the h3d model's nodes. Click on the green **N1** selector to make it active, and then select the center point of the left tire in the animation window.

If you can't see the h3d model, simply use the **Graphical Manipulator** to move the video image out of the way.

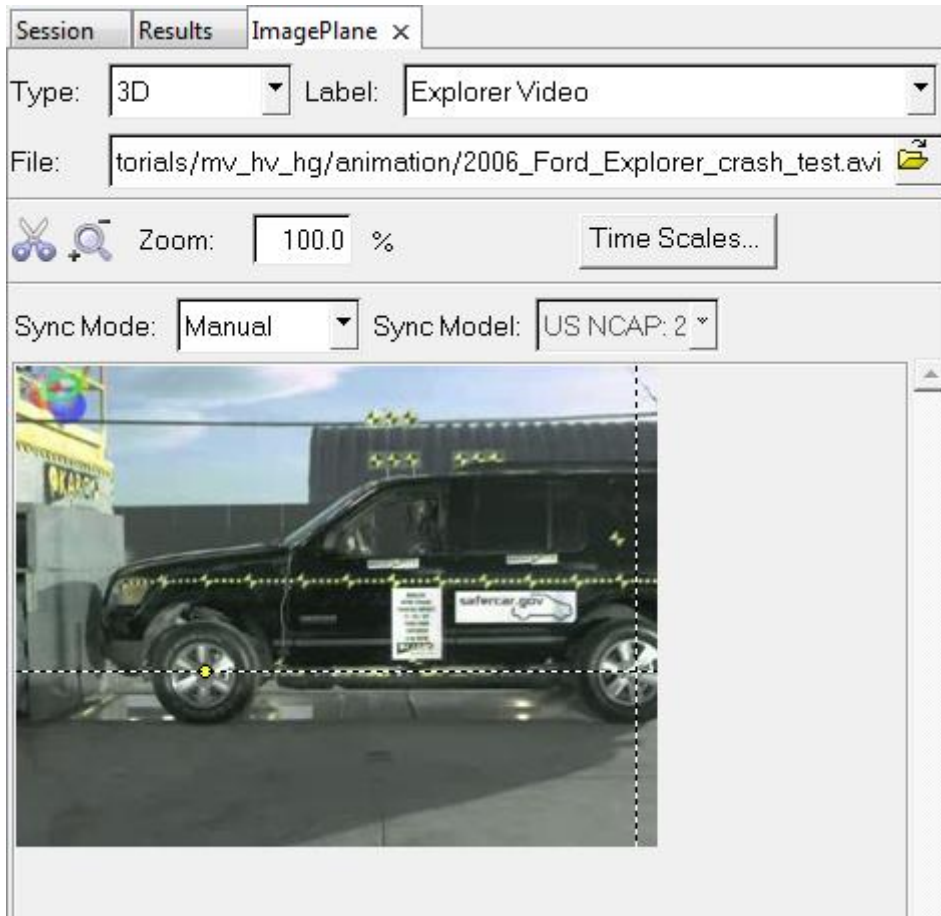
12. Next activate the blue **N2** selector, select the center point of the right tire in the animation window, and then select **Done** in the panel area.

When the two points have been selected, an arrow will be displayed going from N1 to N2.



13. The same two points also need to be selected as reference nodes in the video. Click the yellow **IN1** selector to make it active, and then select the center point on the left wheel of the image preview in the **Image Plane** panel.

- 14. Next click the yellow **IN2** selector to make it active, and then select the center point on the right wheel.



- 15. Click **Align** to align the two images.



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16. Click **Close** to close the **Image Plane** panel.
 17. Animate the model and rotate the images in the animation window.

Notice how the video can be graphically manipulated in 3-dimensions, as well as animated with the h3d file.