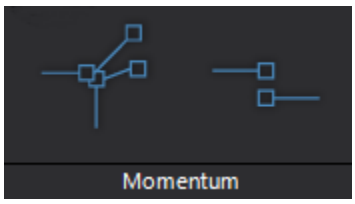
Momentum

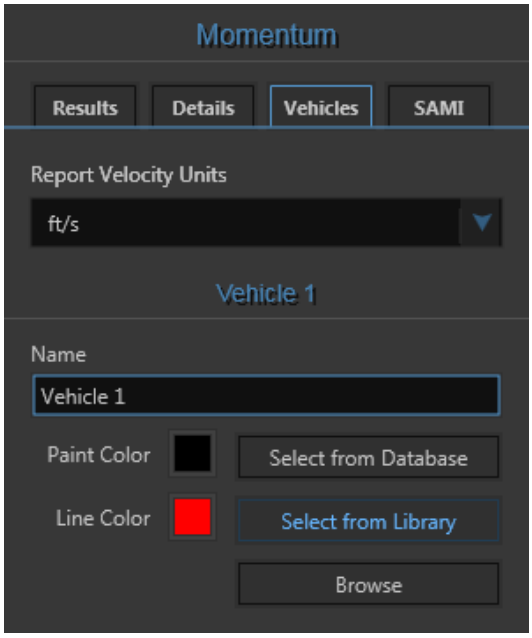
1. The Momentum Genius tool is found on the Analysis tab. Click on either of the options available – Basic or Advanced.

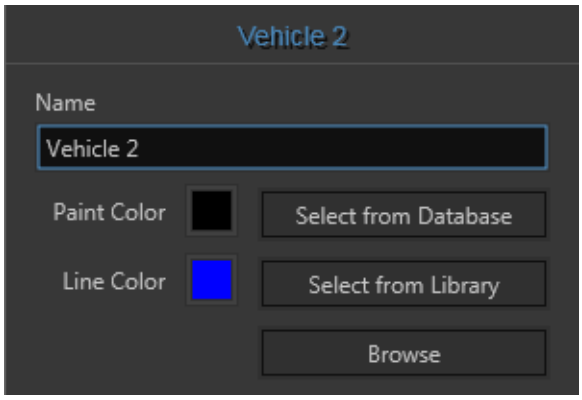


2. Assign the involved vehicles from the Vehicle Information panel on the left-hand panel.

3. Name the vehicles by clicking in the vehicle field so that the names show in the report.

4. Change the vehicle model colors to match the real vehicles.





1. Adjust the vehicle masses if necessary.

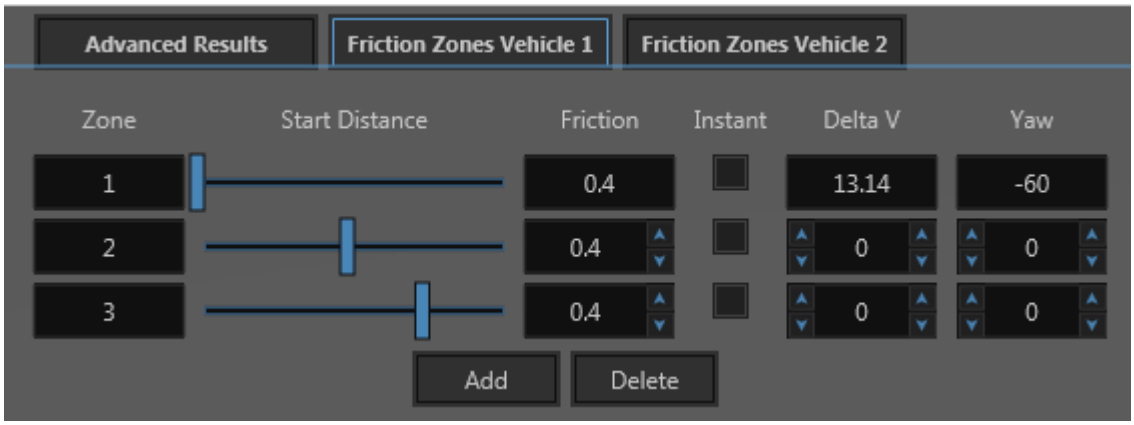
2. Click on the “Details” tab to access the “After Impact” panel as shown below and check the box to “Adjust for Spin”.

3. If you choose Adjust for Spin you must enter numbers that are a percentage (%) of total braking – 0 to 100. Do not enter a drag factor.

4. You must adjust the default friction to be the maximum friction on the post impact surface. The % braking is multiplied by the default friction and adjusted for its angle relative to the trajectory. See the Momentum report for all mathematical explanations and details

8. Click on "Friction Zones Vehicle 1" to set and adjust interim positions for precise rotation control as well as additional friction zones. You can do this for both vehicles by switching between them using the tabs at the top.

9. To add and delete zones use the buttons at the bottom of the form.



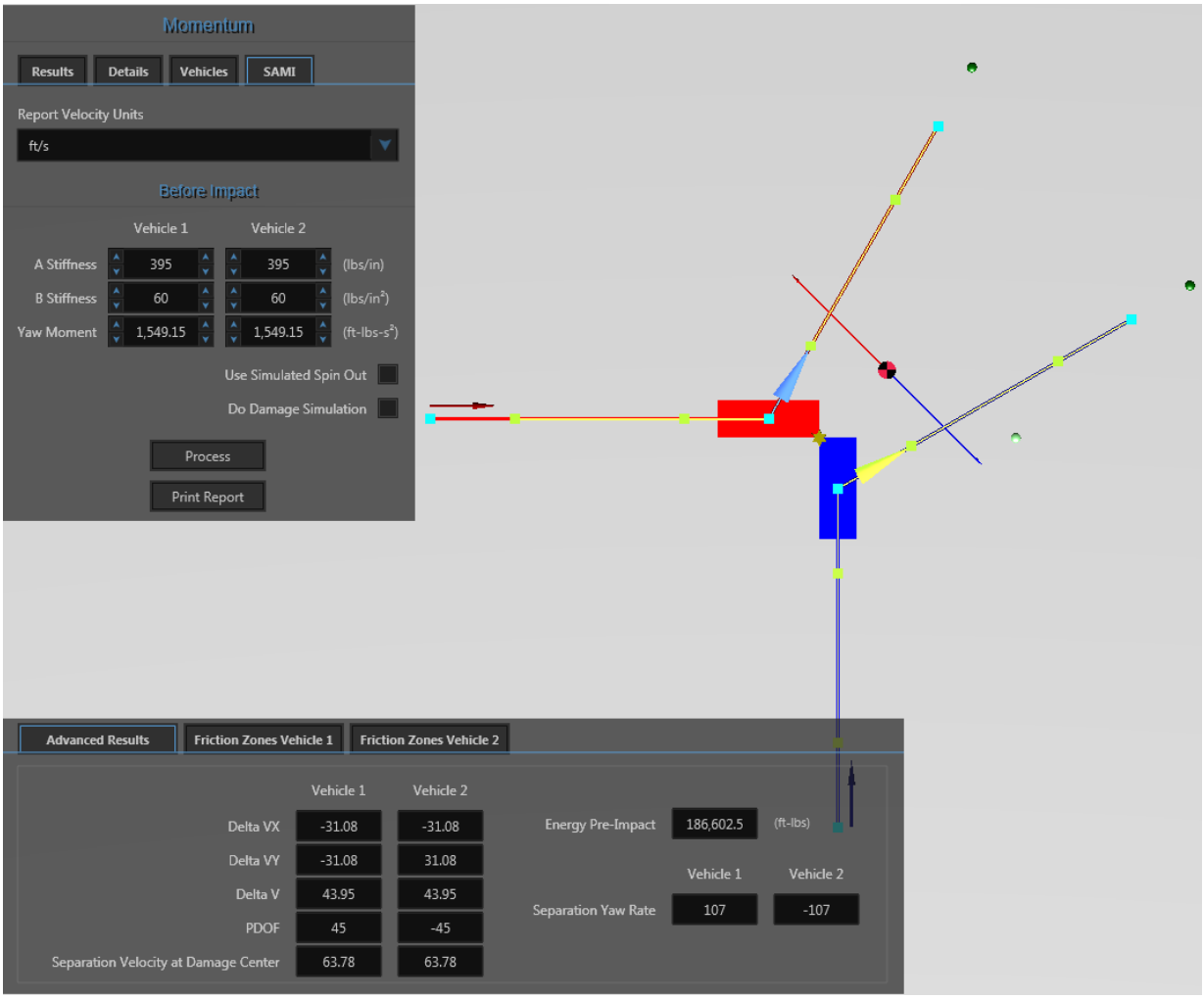
10. When you add more zones, an intermediate position for the vehicle will appear with a grip attached to it so that you may move the vehicle to the desired location.

11. Each new position also provides a red rotation grip for proper orientation.

12. Be sure to adjust all grips, noticing the grip movements will change calculated impact speeds on the left panel.

13. Users can now click Play to view the momentum results as a 3D animation.

SAMI (Simulated Angular Momentum Interactive).



1. **Use Simulated Spin Out** – this tool, when applied, will simulate the amount of rotation and direction of rotation based on user specified impact configuration and damage centroid position. The purpose of this tool is simply to give the user immediate feedback on the assigned vehicle impact configuration. It is used as a tool to test the user inputs when some information about the impact configuration might be missing or insufficient.

2. **Do Damage Simulation** – this tool, when applied, will simulate the extent of the damage based on the momentum based impact configuration and results. When applying this tool it is very important to ensure that the A and B stiffness values are correct. The values shown in the fields above the advanced options are simply defaults and will always be incorrect until edited by the user.

Using Simulated Spin

1. You must first have your momentum alignment set on the scene and vehicles assigned and aligned as you believe they were at impact first contact.

2. Click on the SAMI tab on the left panel.

3. Click the checkbox to Simulate Spin.

4. You will see the tire paths simulated.

5. Adjust damage centroid and vehicle alignment to generate different results.

Using Simulated Damage

1. You must first have your momentum alignment set on the scene and vehicles assigned and aligned as you believe they were at impact first contact.

2. Click on the SAMI tab on the left panel.

3. Check the A and B stiffness values and adjust to proper values using any source you feel is reliable, including the database at Aras360.com/resources (the orange "i" beside each field will launch the aras360.com stiffness database).

4. Click the checkbox to Simulate Damage.

5. Adjust damage centroid and alignment to generate different results.

<u>Additional Tips:</u>

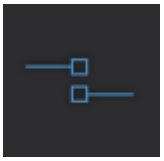
In order for the simulated damage to approximately represent the real damage, you must have a good Momentum result to begin with. Questions to consider:

1. Does the Momentum based Delta V's approximate CDR download data and crush based results?

2. Do the vehicles appear to have reached within 10% of the same separation speeds at the damage centroids?

SCMI (Simulated Collinear Momentum Interactive)

The SCMI system blends conservation momentum solutions for vehicle impact configurations that can be assumed to be head on or same direction (i.e. in-line collisions). SCMI also includes SMAC damage simulation.
SCMI is located on the *Analysis* tab, along with the other momentum analysis tools. Click the button below to place an SCMI system on your scene.



SCMI works much the same as the original Momentum tool. That is, you will assign vehicles on the left panel, and adjust vectors on the scene, just like the other ARAS momentum tools.
To generate the Collinear Momentum Report, simply click to select the SCMI system on the scene. Once the SCMI system is selected, click the Print Report link, located at the bottom of any of the left tabs. An overview of the math equations used for SCMI may be found on the reference page within the Collinear Momentum Report.