About Track Capabilities

A track is a route of a moving object.

This document provides information on the following aspects of track capabilities:

- Objects found on tracks

- Creating tracks

- Track properties (speed/duration)

- Simulating a track

- Changing the moving object

- Copy/Paste capability

- Break link

- Clash reporting

- About Journaling/Automation

- Creating Tracks Using Parts with Context Links

Objects Found on Tracks

Objects found on tracks include:
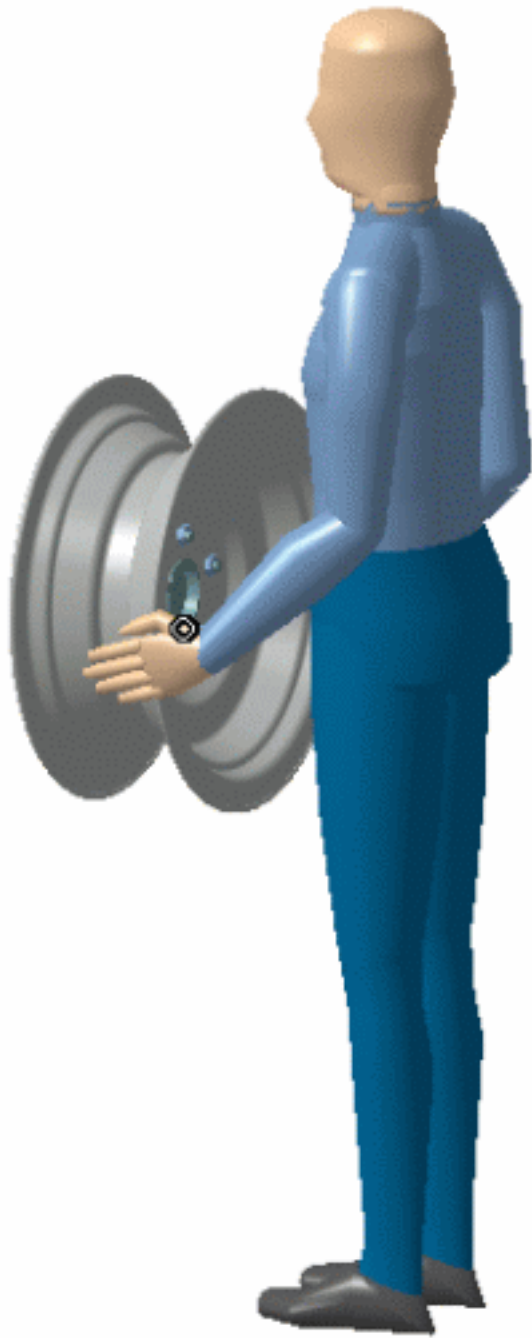
- products
- shuttles
- lights
- cameras

> You may have an active camera automatically updated from the current view, exactly as if you had selected **Update from View** each time you changed the view using translations, rotations, and zooms. (A camera is considered "active" when it is selected or edited in a track.)

> Please refer to the *DMU Navigator's User Guide: User Guide: Using Camera Capabilities* for information about to using camera capabilities and recording a camera track.

- Inverse Kinematics (IK) points from Human Builder manikin
- constrained .CATPart attached to a manikin (the part is moved as well as the manikin, with respect to the manikin's IK

ⓘ   The two capabilities above are available only if your configuration includes Human
     Builder.

Creating Tracks

Two methods are now available to create tracks:

- Clicking **Track** 🖼️ first and select the objects afterwards.

- Selecting the objects first and clicking **Track** 🖼️ after.

Tracks created in this manner are persistent and can be stored in the document. They are listed as separate entities in the specification tree and can be selected at any time and modified.

Track Properties (Speed/Duration)

Tracks comprise defined positions associated with time parameter. The current time is designated with a green bullet.
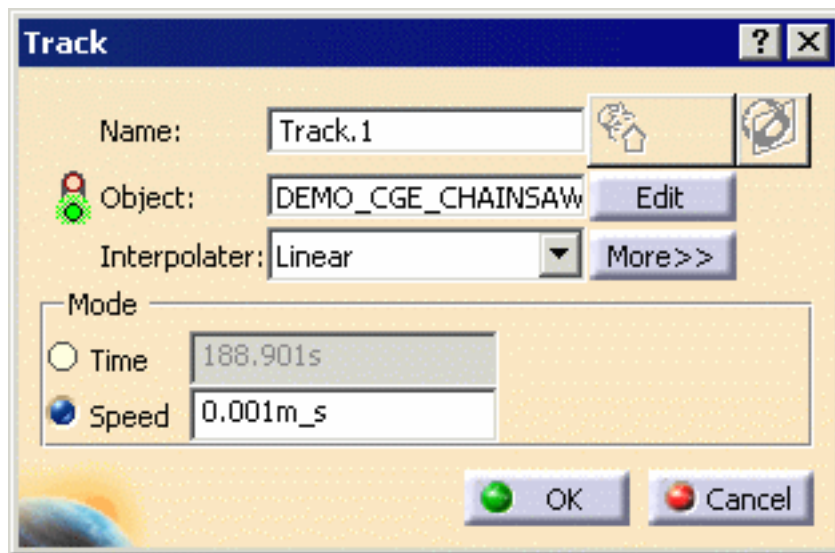
You can insert, modify, delete a position with a dedicated tool.

See Using Track Editor and Recorder.

The track you create is a time-based trajectory. This trajectory can be interpolated with different interpolation types:

- linear (default type for product, shuttles, section planes and lights)
- spline (default for cameras and lights)
- composite spline (enables to minimize the impact of position modifications on the entire trajectory)

The **More** button lets you access and edit the duration for each segment (between two positions) you can :
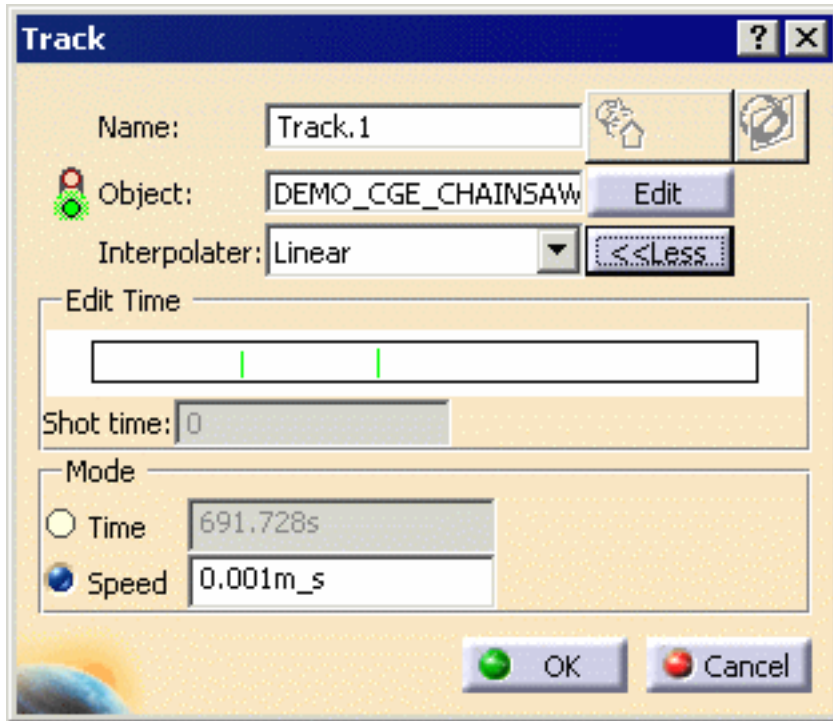
- edit segment duration within the **Track** dialog box using the **More** button
- modify quickly the segment duration using drag and drop capability
- enter a precise value to modify this duration.

Keyboard Shortcut

LMB + Ctrl key: lets you drag each and every segment of the time line representation without changing the global duration.

Please read: Editing Time Line in Tracks.

Track

Name:	Track.1
Object:	DEMO_CGE_CHAINSAW Edit
Interpolater:	Linear <<Less

Edit Time

Shot time: 0

Mode

○ Time 691.728s

● Speed 0.001m_s

OK   Cancel

The **Edit** button lets you access an edit object dialog box (if the object is a shuttle, the **Edit Shuttle** dialog box appears; otherwise, for a section plane, a light or a camera, you see the **Properties** dialog box).

The **Edit** button is unavailable if the moving object is a product.

Track Operators

Positions in the track are defined with respect to the moving object coordinates (i.e., if a track is defined for a light bulb and if the light bulb position is modified in the product definition, the track is updated accordingly and therefore remains consistent).
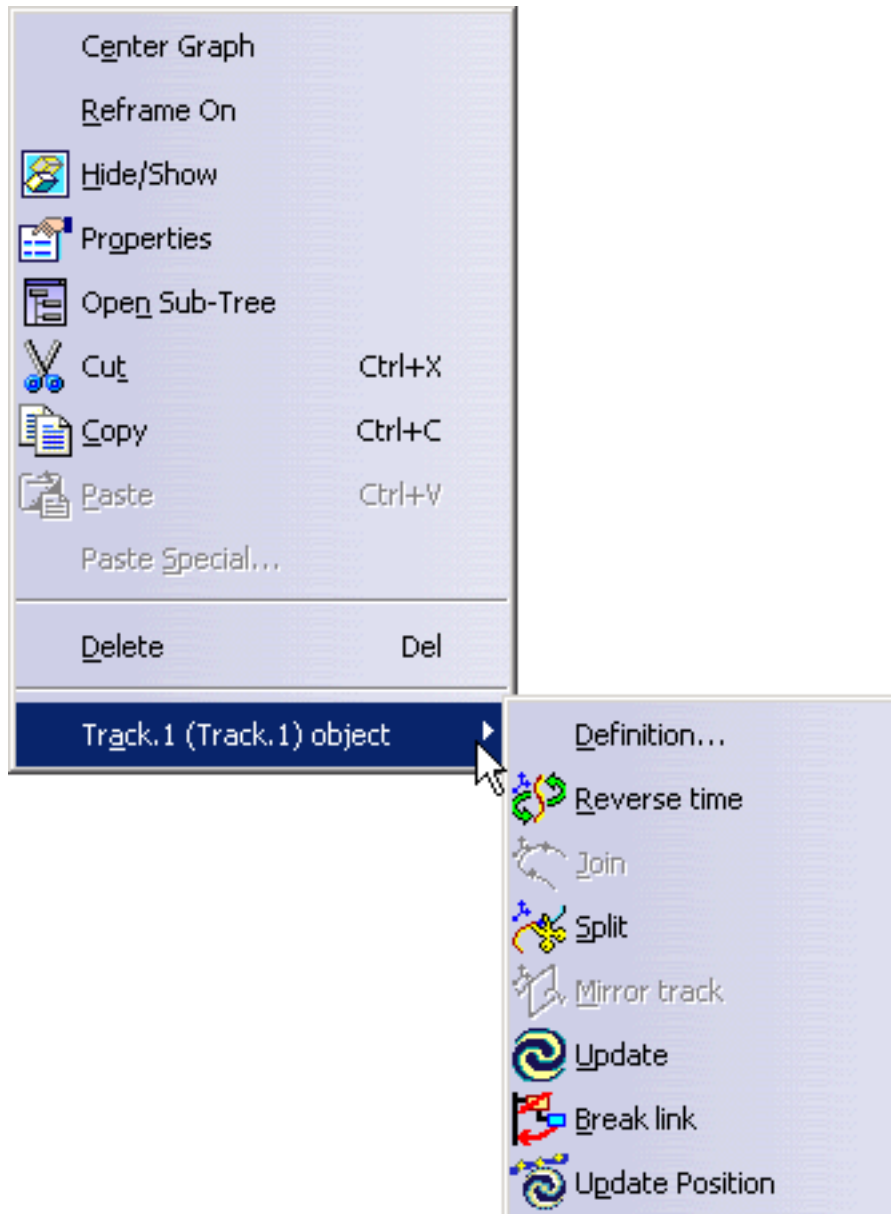
A track can be modified using a variety of operations referred to as track operators:

- **Reverse time**
- **Join**
- **Split**
- **Mirror track**
- **Transform**
- **Path finder**
- **Smooth**
- **Swept volume**

- **Update Position**

The following track operators can be accessed through the track contextual menu:
- **Reverse time**
- **Join**
- **Split**
- **Mirror track**
- **Update Position**

Others can be accessed using standard commands:

- Transform (rotation/translation using 3D compass)

- **Path Finder** (**DMU Check** toolbar)

- **Smooth** (**DMU Check** toolbar)

- **Swept Volume** (**DMU Simulation** toolbar)

See About Track Operators.

Simulating a Track

You can simulate your track using the dedicated player (see About Player). You can also generate an animation file (AVI format) with DMU standard tools (using **Tools > Image > Video...).**

You can compile your track to generate a replay object (using **Tools > Simulation > Generate Replay...**)

You can validate your track using **Clash Detection** available from **Clash Mode** toolbar as well as check interferences and calculate distances specifications.

See Analyzing in Track Context.

Also, for more information about generating an animation file, see the *V5 Infrastructure User's Guide : Basic Tasks : Capturing and Managing Images for the Album : Recording Interactions in Video Format.*

Rotation at 180 Degrees

- In Simulation during Rotation, the products will always be rotated by the minimum possible angle between two consecutive recordings (shots).

- In the case of 180deg, when rotated using the compass panel, the direction of Rotation might not be consistent on consecutive rotations. The direction of Rotation could be either positive or negative.

- However, once a Track is created for 180deg, the direction of rotation will be consistent on consecutive Replays of the Track.

Leaving the Product in a Modified Position

When you exit **Track** , the product remains in its modified position. It can be useful to:

- use it as starting position for a new simulation (e.g., open the front hood before dismounting the spark plugs)

- save this position as a new product configuration.

If you need to go back to the initial product position, you can either:

- play the simulation from the starting position (most useful when you have only one track) or

- use **Reset** from the **DMU Simulation** toolbar.

Changing the Moving Object

You can change the moving object at any time using the **Track** dialog box (click in the **Object** field, then select a new object from the specification tree or geometry). The track can be relocated on this new object or not.

See Using Track Editor and Recorder.

Below are two examples that provide guidance on which option to select:

- An example of **Keep positioning** being the better choice: A track is defined to dismount various objects through a bottleneck. The track needs to remain at the same location with respect to the bottleneck whatever the object is, in this case, you should keep current track position.

- An example of **Do not keep positioning** being the better choice: A track is defined to unscrew a spark plug. You want to make sure this track can be applied to another spark plug. In this case, changing the moving object along the track is valid only if you can unscrew the second spark plug from its current location, choose to relocate the track.

Copy/Paste Capability

You can copy and paste tracks to create instances of reference tracks. If you modify the "shot positions" of a track, the reference track is therefore modified and all the instances will be modified (either instance or reference tracks).

Then, you can apply track operators on instances (e.g., to relocate them keeping the links existing between the references and instances).

For example: you defined a track to remove a spark plug. You create instances for the other spark plugs. You can modify the moving object along the track to move the other spark plugs with respect to the current position of the spark plug instance. All the spark plug instances will be moved with the same motion.

See Copying and Pasting Tracks.

Break Link

This capability lets you break the link existing between the reference track and its instances.

For instance, in the above example, one of the spark plug cannot be dismounted in the same manner, you can use break link to modify this particular instance track without impacting the others.

Clash Reporting

Through the publish capability, you can obtain a concise clash .html report on a single track simulation (automatic clash detection + regular clash analysis). The scenario below explains how to do this:

1. Interferences specifications are defined and linked to tracks in your document.
2. Activate the publish functionality (select **Tools** > **Publish** > **Start Publish...**). The **Publishing Tools** toolbar appears.
3. Click **Player** .
4. Activate the automatic clash detection.
5. Click **Play forward** button in the **Player** toolbar. The clash detection is launched.

6. Click **Stop Publish** or select **Tools** > **Publish** > **Stop Publish.**

7. Read your published clash report.

See Analyzing in Track Context.

See the sections on publishing in both the *DMU Navigator User's Guide* and in the *DMU Fitting Simulators User's Guide.*

About Journaling/Automation

Tracks are journalized. You can generate a macro using **Tools** > **Macro** > **Record...**

See *V5 Infrastructure User's Guide.*

Creating Tracks Using Parts with Context Links

When you create a track using a part with context links, the part turns red. Once you have created the track, right-click the part, and select **Local Update**.