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## Recording Movement and Time

You can wander through your 3D perspective project , change viewpoints , and go up  or down . You can also specify time   .


You can record the tour    and play back your movements. DataCAD Plus vis virtually becomes a camcorder.

### In this chapter:

-  Recording spatial movements
-  Recording temporal effects
-  Playback

## Recording Movement and Time

You can record and play back your tour of the current project in 3D perspective view. Alternatively, you can play back a tour through a past project. In addition, you can record how changing lighting conditions (for example, shadows caused by sunlight or lamps you turned on for illumination at night) over a specified time period affect your project.


The 11 small icons in the video group  correspond to those on a video recorder. You can record either motion (such as a walk through) or a series of fixed images (similar to snapshots) from different viewpoints. You can control how long your animation will last in real time (that is, the time span you want to simulate).

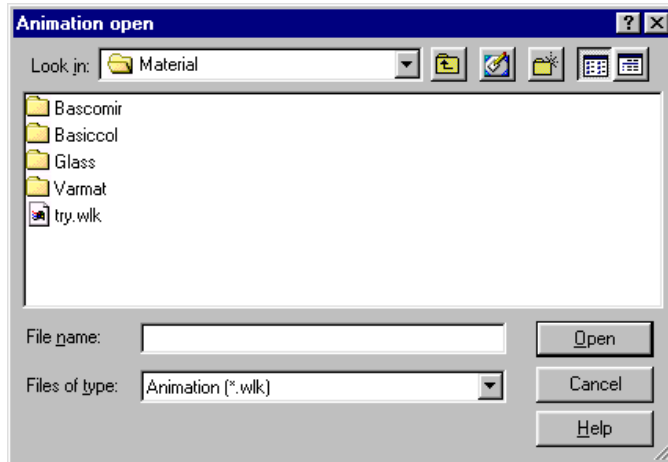
All animations (both spatial and temporal) can also be recorded onto video and exported.

## Recording Spatial Movements

The principle for recording spatial movements is simple. Just as a video recorder requires a cassette, DataCAD Plus vis requires a file for recording movements.

→ To create or open a file for the recording:

1. Click on the video icon Insert/Eject . (This is usually the only active icon in the video group.) The Animation open dialog box appears.









2. Supply a file name for a new recording or select an existing animation file you want to play or overwrite.
3. Click on Open or press **[Enter]**. Notice that many of the previously inactive (grayed out) video icons are now available.


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If you want to record or play another file, press  to eject the old file and start a new one.

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→ To start the recording:

1. Click on the red Record button .
2. Use the , , , , and  icons to move about in your 3D perspective view of the project. Each new picture that is calculated and displayed corresponds to a television picture on the video recorder. DataCAD Plus vis records these images in the file you created.



3. Watch the message bar at the bottom of the screen while you are recording. The message bar displays how many pictures you recorded or played in the video. DataCAD Plus vis displays the playback running time (based on 15 pictures per second) for the video in parentheses. This information is important if you want to record the whole thing as video.
4. Click on the black stop button  in the video icon group to end movement through the project.









When you click on the red record button , DataCAD Plus vis overwrites any information in the opened file. This is fine if the file is new, but it could cause problems in an older file of a previous recording.

For example, if the file contains 500 frames (pictures) and you record 10 new frames, DataCAD Plus vis overwrites 10 of those 500 frames. Which 10 frames it overwrites depends on the position of the tape.

When you first open a file, DataCAD Plus vis automatically rewinds the tape so you always start at the beginning. If you start recording at the beginning of a tape, you would overwrite the first 10 pictures in the file. The four arrow (back one frame, rewind, forward one frame, and fast forward) video icons help you move back and forth in the recording. The numbers on the message bar also help you determine what position the current frame occupies in your recording. Therefore, if you press the record button at frame 490 and record 10 frames, DataCAD Plus vis will overwrite the final 10 frames of the file.


➔ To play back a previously recorded file:

1. Rewind the tape with the icon  to get to the beginning of the file.
2. Click on the play icon . The individual frames are played back in sequence.

During playback, you can also switch between day and night views (the time-dependent   ) as well as the different view models (    ). You can also modify the window size during playback. This lets you optimize the playback rate by reducing the window size or selecting the wire model as the view mode.


When you are playing a video, all movements occur only on the display; they are not being saved. This gives you a rapid overview of your project or lets you preview scenes while you are creating a video that records pictures and movements together.





## Recording Temporal Effects

Basically, recording (and showing) temporal effects is the same as recording (and showing) spatial movements. Either way, you start by selecting a file to playback or record onto, by clicking on the icon Insert/Eject . Of course, you can overwrite an existing file. However, the prerequisites for and the methodology of recording temporal movements differ slightly.

In your video, you can explore how the lighting conditions in the living room of a house change during the day and merge this into your animation. Also, you can maintain a fixed position in your project and designate how many frames you want to contain still pictures which show the time-based effects of the changing position of the sun. (In this case, only the time changes, letting you watch the effect of the sun's position during that period.)

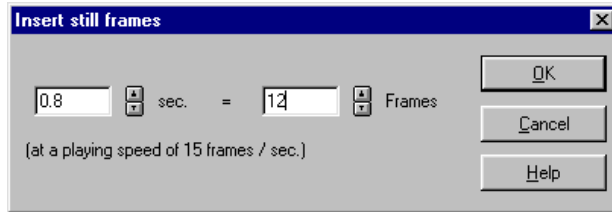
With still pictures (or fixed images), you can demonstrate movement by lining up several snapshots showing modifications (such as different brightness levels and the effects of lamplight) that occurred over time.

In our example, the position of the sun during a walk through is set to June 28, 1997, and recorded over a 24-hour period. Since in our example, the animation and recording of time are practical only in connection with the time-dependent view , you must adjust these before starting the recording. Naturally, even after you've clicked the record button, you can change the view. Also, you must orient the buildings the way they will actually be on the site by supplying a North arrow.

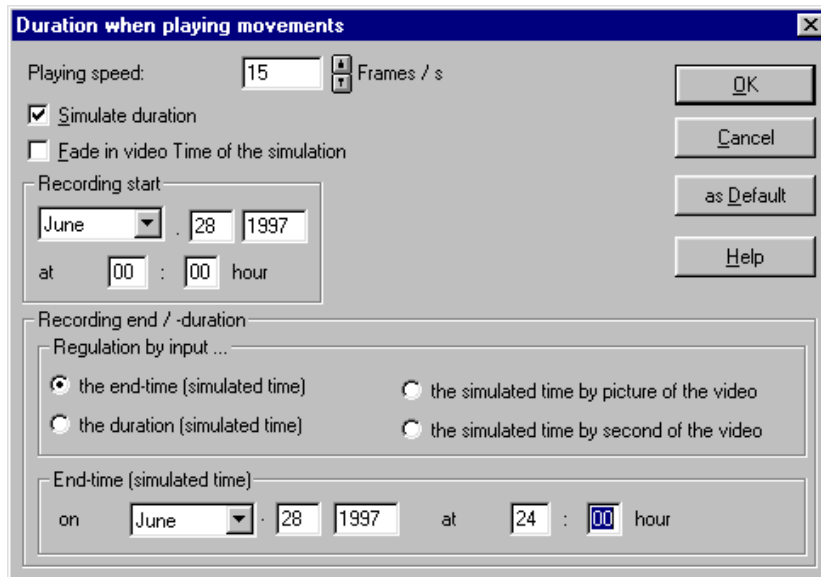
1. Click on  Insert/Eject in the video icon group and create a new file (or load an existing one) in the Open animation dialog box.
2. Click on the red Record icon . Now start your walk through by moving normally through the room as DataCAD Plus vis records the tour in sequential pictures. Create your tour so that you arrive at a window after taking 12 steps (pictures) in a room (such as the living room of a house). To record temporal movements without changing the position, you must create fixed images.
3. Select the time-dependent view  and define it in the Daylight dialog box. Use the exact latitude and longitude settings for the project. You do not have to enter the exact local time. The clock times will be set later to indicate the sun's position.
4. Click on  in the video icon group. The Insert still frames dialog box appears. Type the value 12 in the Frames field to insert that many fixed images into your animation. Then click OK.

DataCAD Plus vis automatically calculates how long the animation will last, at a playback rate of 15 images per second. Alternatively, you can determine the duration and DataCAD Plus vis will adjust the number of frames. Both input fields are perfectly synchronized; modifying one affects the other.

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5. Indicate the time period for the complete animation before you conclude your recording. Click the right mouse button on any active button of the video recorder. The Duration when playing movements dialog box appears. Here, you determine what real time is to have passed when playing the animation. Since we want to document a whole day from 0 o'clock to 24 o'clock, activate (checkmark) Simulate duration and input the date June 28, 1997 at 00:00 hour in the Recording start fields. In the End-time (simulated time) fields insert June 28, 1997 at 24:00 (midnight). Click OK or press **[Enter]**.



6. Click on ■ to stop the recording.

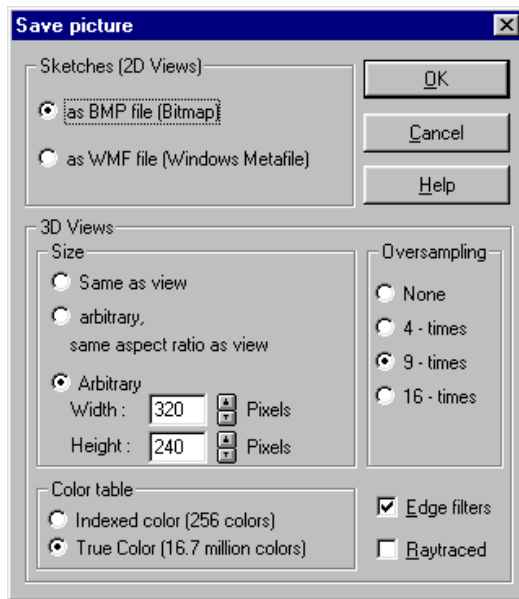
When playing, the frames will run successively: first the frames with the 12 cyclical pictures, then the 12 fixed images. Based on the settings in the Duration when playing movements dialog box, this total playing time corresponds to a realistic 24-hour period.

This means that time is simulated; the time per frame progresses exactly one hour and the lighting conditions change accordingly. In this case, the first 12 hours fall during the walk through; the second half of the day is captured by the fixed images. If you sat down at a west-facing living room window during the recording, you could see the sun setting. At the end of the simulation, it is midnight again.

## Saving a Video for Later Playback

In addition to immediately playing the recorded movements on your monitor, you can save them in a Windows-compatible video file (with the .AVI extension). Later, you can play this video file with Windows media software even when you are not running the DataCAD Plus vis program. For more information about .AVI, refer to your Windows documentation.

The actual settings for time (☀ ☾ ☽) or view modes (📐 🟩 🟩 🌐 📄 📄) are saved in the video file. However, DataCAD Plus vis also uses the same settings in the Save picture dialog box (controlled by right-clicking on 🖼️) for both 3D bitmap pictures and videos.




- To set the format for your video recording:
1. Right-click on 🖼️. The Save picture dialog box appears.
  2. Select as BMP.
  3. Set the Size to Arbitrary. Keep the dimensions relatively small. DataCAD Plus vis recommends 320 pixels for the Width and 240 pixels for the Height.
  4. Select True Color. Some video compressors produce inaccurate results with indexed-color (256 colors) pictures.





5. Set Oversampling to 9 times. This helps avoid flicker effects during movement. The human eye reacts much more sensitively to so-called aliasings, which can result during movement in the animation.
6. Activate (checkmark) Edge filters.

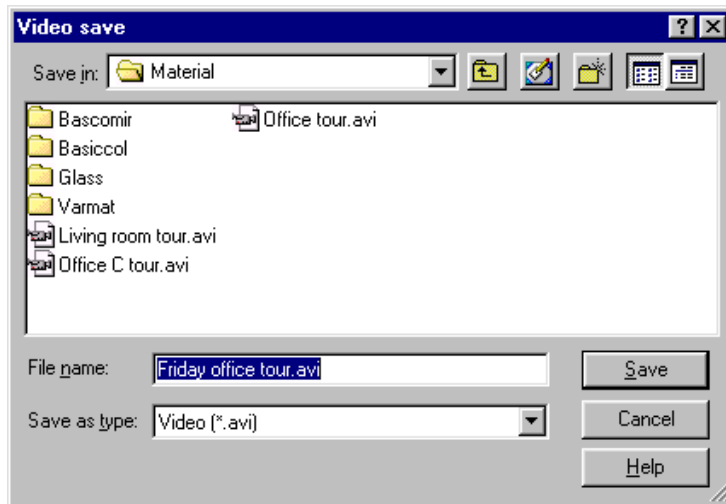
Caution: You can also raytrace the frames when saving a video if you activated (checked) Raytraced. That means each frame will be raytraced. If raytracing one figure takes 10 minutes and your video will have 500 pictures, you could paralyze your computer for several days. Your best option is to schedule those videos to record over a weekend.

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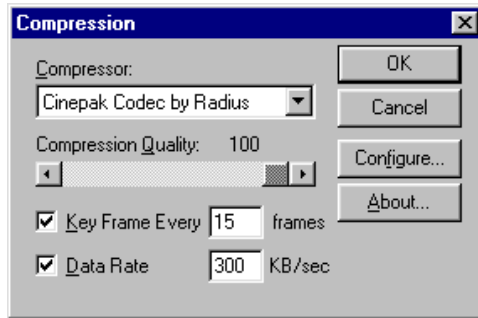
Note: If Raytraced is activated, the setting (based on your choice of a  icon) for the current type of dithering is insignificant for storing videos.

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- ➔ To record and save a video for future playback:
1. Set the format for video in the Save picture dialog box. (Refer to steps in the previous paragraphs.)
  2. Click on  for Insert/eject, supply a name in the Animation open dialog box, and click on Open or press **[Enter]**. The video icons are activated.
  3. Click on  for Save (AVI). The Video save dialog box appears.



4. Supply a file name and click on Save or press **[Enter]**. This will save your file with an .AVI extension. The Compression dialog box appears.




5. Select the compressor, regulate compression quality, activate key frames, and select OK or press **[Enter]**.

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Compression using the CinePak Codec by Radius produces the best results. Cinepak is a standard Windows video compressor and is largely supported across applications and platforms. New compressors are coming out all the time, so you may find one that produces excellent results; however, remember that you must have that compressor available on any computer you use for playback.

Use the slider to set Compression Quality to 100. Activate (checkmark) Key Frame Every and type 15 in the input box. Depending on your requirements, you may lower these values.

6. Click on the red Record icon  and begin recording. (Refer to the preceding information about recording spatial movements and recording temporal effects.)
7. Click on the black Stop icon to end the recording.

DataCAD Plus vis conserves your computer's disk space by compressing videos. However, the advantage of creating a smaller file is balanced by the compressed video's reduced quality. The more you compress a video, the lower its quality. Video quality is also affected by the type of compressor you select. Refer to your Windows documentation for further information about compressors.

➔ To play back a recorded and saved video:

1. Find the video you want to play.

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You can do this by selecting Find from the Windows Start menu, typing \*.AVI in the Named field, and clicking on Find Now. If you are already in DataCAD Plus vis, you can select Open from the File pull-down menu and search for .AVI files in the Project load dialog box.

2. Double-click on the .AVI file you want to begin playback.

## Notes on Creating Videos

If you have never created videos on your computer, we recommend you read this chapter and play a bit with the software. Here are a few more helpful hints:

Avoid large resolutions. A resolution of 320x240 pixels should work well; 640x480 pixels may work on faster computers. Unfortunately, some compressors cannot properly handle very high resolutions.

Pictures you save as videos should be highly filtered. In the Save picture dialog box, activate (checkmark) Edge filters and set Oversampling to 4 times or 9 times (even better).

If you record the movement (not when playing back the video) with very large view windows and or the highest quality textured 3D view, both the frame rate and image quality will be significantly low. To avoid this, select a relatively small picture for recording movement. You may also consider viewing the wire model or the medium-quality colored view.

If you want to record a raytraced animation, use the same project and activity and make a video file using the normal dithering. Or try raytracing a relatively small picture size (for example, 160x120 pixels). This will give you an idea of the image quality and how long it takes to create the animation file. The raytracing calculation duration is proportional to the size of the pictures multiplied by the oversampling rate. For example, a 320x240-pixel picture with quadruple oversampling lasts 2x2x4 times as long as a 160x120-pixel picture without oversampling. The calculation time for a stamp-sized video may reach eight hours for a finely filtered video in double resolution for both X and Y. The other version may take only one hour.

