Technical Newsletter

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2021 *HVE* Forum

The *HVE* Forum is headed to Fort Myers, Florida during the week of February 22-26, 2021. This is the first time the Forum is being held in Fort Myers and it will also be the first time several new workshops will be offered, adding to the over 30 workshops available at the Forum.

The *HVE* Forum is a great opportunity for all levels of users to learn how to use *HVE*. For workshop and hotel information and to register, go to www.edccorp.com or call 503-644-4500. We are happy to discuss the workshop options with you to select the workshops that maximize your week of learning.

""I attended last year's HVE Forum in Austin. The forum is a great opportunity for new and experienced HVE users to learn valuable skills from the EDC software developers and power users. Good food, drinks, and networking opportunities were abundant. I highly recommend the event. It is a great value and a lot of fun."

-Daniel Honeycutt, ESi

HVE 2020!

HVE 2020 will be available for download in September! There are several new features in the Video Creator, including the ability to export to frames. See the technical session in this newsletter to learn how to use this new feature. There are also new vehicles in the *EDVDB* vehicle database.

Make a Break for the 2021 HVE FORUM

WORKSHOPS
Advanced *HVE*
Introduction to *HVE-CSI*
3D Vehicles: *SIMON*
DyMESH 3-D Collision Model
Intermediate Simulations for *HVE & HVE-2D*
Simulation Fundamentals for *HVE & HVE-2D*
Tips, Tricks and Tech Support **NEW**
HVE White Paper Session
HVE Users Groups
Using *DamageStudio*
Advanced 3D Environments
3D Editor: Functionality, Friction Zones & Importing Models
3D Vehicles: *HVE* BrakeDesigner & Blowouts and Rollover
Theoretical and Applied Vehicle Dynamics
Simulation Movies: HD Video Output
Advanced Video Techniques
Advanced *EDCRASH* **NEW**
Building a Vehicle for *HVE & HVE-2D*

February 22 – 26
Crowne Plaza at the
Bell Tower Shops
Fort Myers, Florida

ENGINEERING DYNAMICS COMPANY, LLC

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Severna Park, MD 21146
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503.644.4500

Technical Session - The Video Creator

This technical session introduces the new features available in the Video Creator. The changes include the following:

- Rendering to image frames (.jpg) and/or to a movie file (.avi)
- Uniquely naming movie and image files and save to a user selected directory
- Outputting at any frame rate between 1 and 1000 frames per second
- Playing back any movie file located in the user selected directory

Rendering

The most exciting change to the Video Creator is the ability to render to frames and/or to a movie file. These options are found in the Video Setup Dialog launched by clicking the Video Setup button on the Video Creator Window:
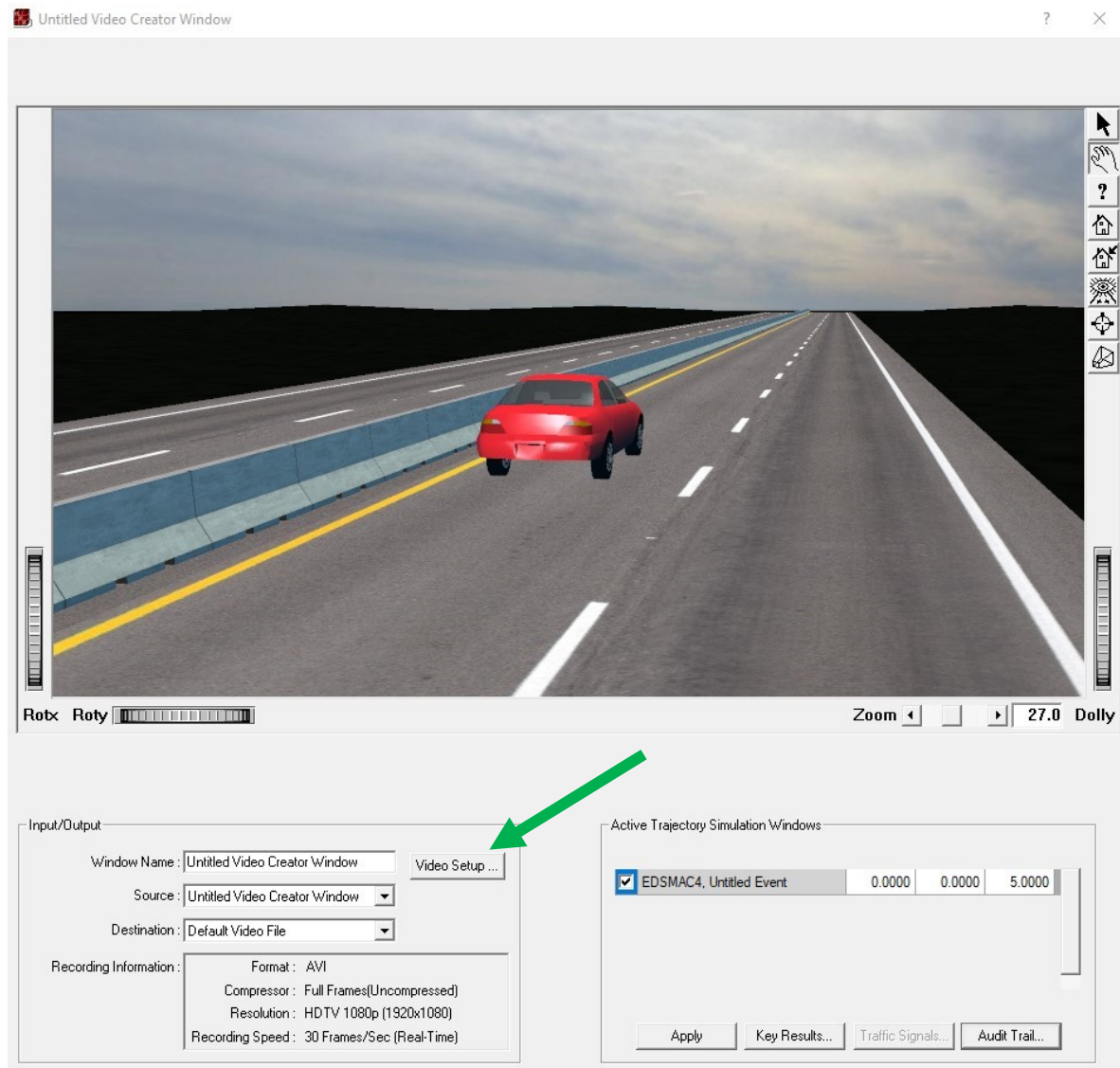
The checkboxes for Type: allow you to choose between rendering to a movie (AVI) or rendering each frame to an image (Single Frames) or both.

The text entry Name: allows you to name the movie file and add a prefix to the rendered frames.

Unchecking the checkboxes Overwrite Existing Movie and Overwrite Existing Frames will prevent you from overwriting previously rendered movies or frames with the same names.
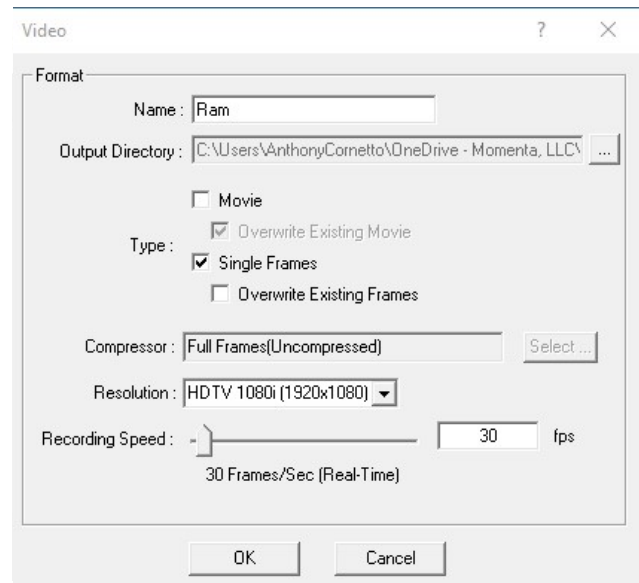
(Note: the Destination dropdown in the Video Creator Windows must still be set to "Default Video File" in order to render.)

You can now select the Output Directory to save the rendered movies. Frames will be saved to a subfolder called Frames within the selected Output Directory folder.

The frames are numbered based on the playback speed. For example, at 30 frames per second, frame 0 will be time 0 second and frame 3 will be time 0.1 second.

Tip #1

Select Single Frames in the Video Setup Window to render to frames. Start the render process by clicking the play button on the playback head. Pause the render process by clicking the pause button on the playback head. Make some changes and then continuing rendering. For example you can do the following:

- Slide the playback to a different time
- Change the camera position
- Change the Active Trajectory Simulations
- Change the Resolution
- Change the Rendering Options

When rendering to frames you can even render when playing in reverse!

Recording Speeds

Another change to the Video Creator is the ability to render at Recording Speeds below 30 and above 300 frames per second. The Recording Speed setting is also located in the Video Setup Dialog. The slider can now be set to any value between 1 and 1000 Frames/Sec. The value can also be entered directly into the new text entry box for Recording Speed. The wider Recording Speed options can be very useful, especially in combination with the ability to render to frames.
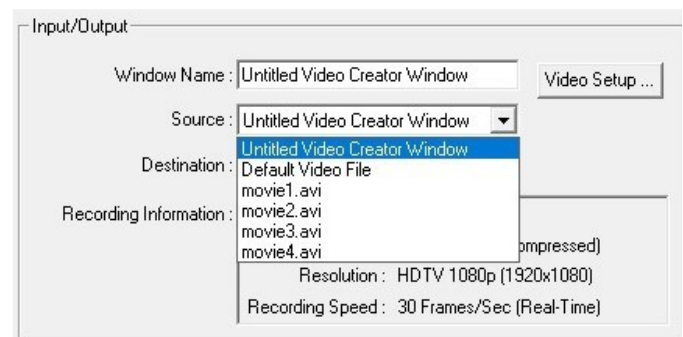
Tip #2

Choose a low Recording Speed, for example 2 Frame/Sec, and select the Single Frames checkbox in the Video Setup Window. This will generate one image each 1/2 second. The rendered frames can be used to easily make effective illustrations of the vehicle motion like the examples to the right and below.

t=0.0 sec

t=0.5 sec

t=1.0 sec

t=1.5 sec

t=2.0 sec

t=2.5 sec

t=0.0 sec   t=0.5 sec   t=1.0 sec   t=1.5 sec
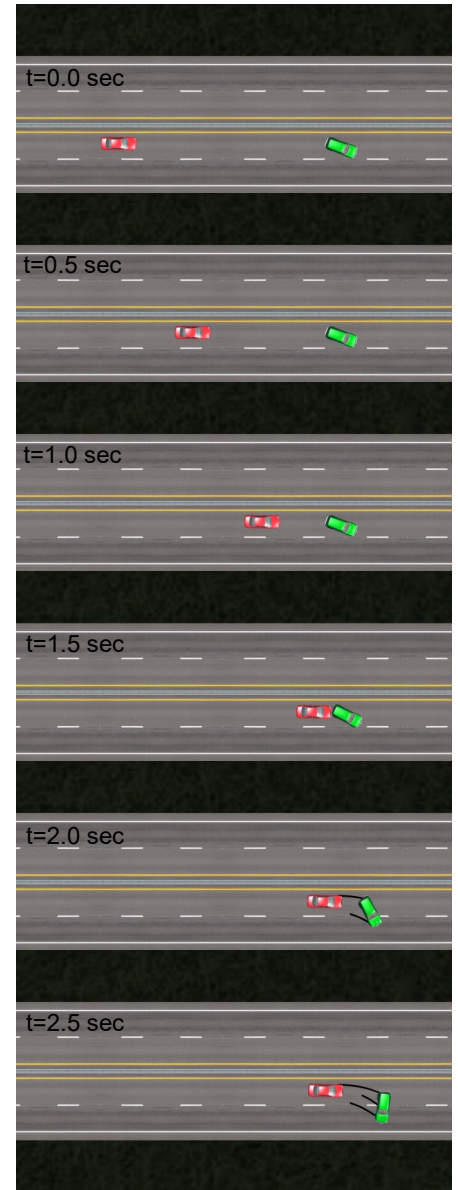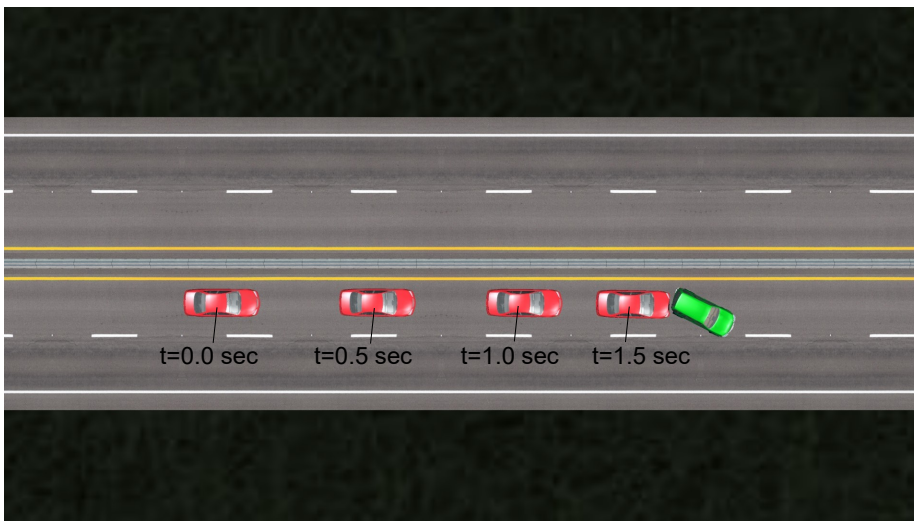
Playback

The last change to the Video Creator is that any .avi movie located in the user selected Output Directory can be used as a source file and played back within *HVE*. The available movies are located in the Source dropdown in the Video Creator Window:

Input/Output

Window Name : Untitled Video Creator Window   Video Setup ...

Source : Untitled Video Creator Window

Untitled Video Creator Window
Destination : Default Video File
movie1.avi
Recording Information : movie2.avi
movie3.avi
movie4.avi   ompressed)

Resolution : HDTV 1080p (1920x1080)

Recording Speed : 30 Frames/Sec (Real-Time)

EDC Reconstruction
November 9 - 13, 2020
Miami, Florida

EDC Reconstruction is an extensive one-week training seminar that offers an excellent way to learn the inner workings of *EDCRASH*. The course focuses on the physics model, the calculations and the underlying assumptions for each of the program's five major calculations procedures.

EDC Reconstruction is designed to be like a college physics course—a combination of morning lectures and afternoon hands-on lab exercises. The fact that this course has been presented for over 25 years ensures that students benefit from a well designed and well executed week of instruction.

EDC Reconstruction has been pre-approved for 40 ACTAR CEUs. All course materials, including a handbook, training manual, software and temporary licenses, are provided to each student.

Bring your scientific calculator and laptop computer. Four lab exercises include damage-only analysis, collinear head-on and rear-end collisions and oblique collision.

Links to download your course registration form and to make your hotel reservations at the Hampton Inn Dadeland, Miami, Fl, are available on the EDC Reconstructions page in the Training section on www.edccorp.com.

Contact EDC at 503-644-4500 to sign up today!

Call for *HVE* White Papers

HVE users interested in presenting a technical paper in the *HVE* White Paper Session at the *HVE* Forum are invited to submit an abstract for consideration. This session is an opportunity for you to showcase your skills to other *HVE* users as well as to non-*HVE* users who may wish to hire you as a consultant. *HVE* White Papers are made available to download from the *HVE* White Paper library, providing excellent visibility for your work.

The following subjects will be considered:
- *HVE* Case Studies
- Innovative Tips and Techniques Using *HVE*
- Any Application of *HVE* Showcasing its Capabilities (especially events involving important 3-dimensional vehicle behavior)

If you are interested in contributing, please submit your abstract of 100 to 250 words in length to EDC. Please email complete contact information for the lead author with an abstract to forum@edccorp.com.

HVE Training Partners

HVE, *HVE-2D*, and *HVE-CSI* users looking to improve their skills, but unable to attend one of EDC's regularly scheduled courses, can contact an *HVE* Training Partner for assistance. *HVE* Training Partners are experienced users who offer introductory and custom training courses on the use of *HVE*, *HVE-2D*, *HVE-CSI* and *HVE*-compatible physics programs. The list of HVE Training Partners is available at www.edccorp.com.

FAQs

Q: I'm trying to create a custom tire within *HVE*'s Vehicle Editor but *HVE* will not accept the tire size string I'm entering. What tire size strings does *HVE* accept?

A: Here are examples of various accepted tire strings within *HVE* (in no particular order):

1. P225/60R14
2. LT285/60R17
3. 6.5-16LT
4. T105/70R14
5. 385/75R22.5
6. 27x8.5-14LT
7. 8R19.5
8. DT155/80R13

Q: Why can't I display a truck's connection forces within the Key Results but I can display the trailer's connection forces?

A: Connection forces can be viewed within 2 areas of Key Results. The "Kinetics" output group Connection values are available for both the Truck and Trailer and report the sum of the front and rear Sprung Mass forces and moments. If there is only one connection (front or rear) then the reported forces and moments will be from that single connection. These are the sprung mass forces and moments that go into the equations of motion. There is also the "Connections" output group that reports the front (only) connection forces and moments for the selected vehicle. At this time *HVE* does not include a variable output for the truck's rear connection within the "Connections" output group.

Q: Why does my vehicle shimmy when its velocity is reported to be zero or close to it?

A: A fixed timestep simulation never reaches perfect zero velocity, it will always have some tiny velocity. That tiny velocity produces forces and those forces produce accelerations; that is why you may see lateral tire forces when a vehicle is sitting with a near zero velocity. When those lateral tire forces become large enough the vehicle will begin to shimmy side to side. This effect can be reduced by decreasing your integration timesteps, zeroing out the vehicle's steering and placing the vehicle on a flat surface.

Q: What exactly does the *DyMESH* "Force X-Y Plane" option do?

A: The "Force X-Y Plane" option causes *DyMESH* to ignore the Fz component of the impact forces. Specifically, it sets the Fz of each damaged vertex to zero. The moments are calculated normally but they are affected by the zeroing out of the Fz at each vertex.

Q: I'm simulating a very low-speed impact within *EDCRASH* and the reported Delta-V is smaller than expected. Why?

A: *EDCRASH* ignores restitution and assumes that the relationship between stiffness and crush is linear. These factors can cause the delta-V for a very low-speed impact to be underestimated. This is covered in SAE 870045 "An Overview of the Way *EDCRASH* Computes Delta-V" available in the online Technical References Library.

New Vehicles in the *EDVDB*

The following vehicles have been added to the *EDVDB* vehicle database available with the release of *HVE* 2020.

Make/Model/Body Style	Model Years
BMW 740i 4-Dr	2016 - 2020
Honda Passport 4-Dr	2019 - 2020
Hyundai Elantra 4-Dr	2017 - 2020
Kia Forte5 5-Dr	2014 - 2018
Lexus GS 350 4-Dr	2013 - 2020
Nissan Altima SR 4-Dr	2019 - 2020
Nissan Murano SL 4-Dr	2015 - 2020
Volkswagen Passat TDI SE 4-Dr	2012 - 2019

If you have any specific vehicles that you would like to see added to the *EDVDB* vehicle database, please let us know by sending an email to vehicles@edccorp.com. We will do our best to try to add them to the database.

HVE Discussion Groups on LinkedIn

www.linkedin.com/groups/8809876

The *HVE* Users Group is a discussion group for users to ask questions, share knowledge, and discuss techniques. There will also be announcements made in the group regarding software releases, development, future training meetings, etc. Please take an opportunity to join.

Engineering Dynamics Company

Training Course Schedule

EDC Reconstruction

Miami, FL.....….….……November 9 –13, 2020

EDC Simulations

Burbank, CA……..…...January 11 - 15, 2021

Theoretical & Applied Vehicle Dynamics

Upon Request

2021 HVE Forum

Fort Myers, FL.……....February 22-26, 2021

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