**1. Starting and Stopping the Simulator**

Welcome to the Connecticut Transportation Safety Research Center Driving Simulator training.  
In this first video, we’ll cover turning the simulator on and off.   
It’s a multi-step process that can take some getting used to.  
We’ll also cover troubleshooting a few issues that might come up during the start-up process.  
But first, let’s get oriented to the driving simulator lab.

Here’s a top-down view of the sim lab.   
On the far left we have labeled the “Door with card access”  
You’ll need your UConn ID to enter the sim lab. This door on the left is the only one with a card reader, so if you’re the first one in the lab for the day you’ll need to enter this way. When entering, hold your card up to the card reader, wait for the beep, then push the door handle in before opening the door. That’s right – the door won’t open unless you push the handle in before pulling the door open.

Near the lab entry you’ll find two important features. Up top, or to your left as your enter, you’ll see the breaker boxes on the wall. We’ll come back to those in a minute. On the bottom, or to your right as you enter, you’ll see a small refrigerator with water bottles. When running experiments in the simulator, we often have to watch for signs of “simulator sickness” – a kind of motion sickness that occurs for some people when using the simulator. A bit of water can help with simulator sickness, so we keep bottles on hand for study participants.

There’s a second door to the lab, shown here on the bottom of the diagram, that can only be opened from the inside of the lab. Typically, we leave that one propped open while working in the lab to let in participants from the building lobby.

Moving along you’ll find the driving simulator itself. It’s hard to miss.

Surrounding the sim are six projection screens. These give a near 360 degree field of view when driving in the simulator. If you look up, you’ll see that there are six projectors over the simulator, one for each screen. The projects and screens are labeled here according to their position. Going clockwise, we have center, right center, right, rear, left, and left center.

Behind the right and right center projection screens you’ll find much of what makes the simulator run. Against the wall, we have a computer that handles eye tracking and collection of physiological data like heart rate and galvanic skin response. You can ignore this computer if the study you’re working on doesn’t require those.

Farther back you’ll see a large rack of computers and other equipment. There are nine computers used in the basic operation of the simulator, and they’re all housed here. We’ll come back to this in a minute.

Next door you’ll find the control room. This is where you’ll be if you’re designing or running an experiment. As you enter the control room, look to your left. You’ll see two computer monitors. These monitors are hooked up to two of the computers on the rack in the adjoining room – Host, and SimObserver. Host is used to design and run experiments. SimObserver is used to observe experiments as they happen, and record data.

Finally, we have the desktop sim. It has many of the same features as the full-scale simulator, but runs on only one computer. And obviously, there’s no car – you can control it with the keyboard and mouse, or a driving wheel and pedals. We won’t cover the desktop sim in these videos, but many of the procedures for using it are the same as the full-scale sim. It’s nice to have if you’d like to work on a simulator project, but the full-scale sim is already being used for a different study.

Now, on to starting the simulator.

The process begins in the control room. Here you’ll see the monitors for Host, on the left, and SimObserver on the right. Pardon the mess.

Between the two you’ll see a large switch with orange labels. This is the main power switch for the simulator. To get things going, turn it from off -

to on.

Head into the other room, and make your way over to the rack in the back corner. It’s to your right as you’re leaving the control room.

Sitting on top of the rack are four audio amplifiers. These handle all audio for the simulator – road noise, engine noise, wind, other cars, and so on. Each on has a large power switch on the front panel. Switch all four from off –

To on.

Next, hit the power buttons on each of the nine computers on the rack.

You should get a blue light on each when it’s on.

Each of these computers corresponds to one part of the simulator. Here we have them labeled. The two computers on the right are Host and SimObserver – you’ll remember these as the ones in the control room. On the left we have Right, Righter Center, Center, Left Center, Left, Side Mirrors, and Rear. You might have noticed that some of these share names with the projection screens. That’s because each screen, and each projector, is handled by one of these computers. Each computer is running an instance of a program called “Fusion”. You’ll sometimes see Fusion referred to as the “image generator”, or just IG. These image generators are synched up through the Host computer to display the complete driving environment. Additionally, there’s a dedicated computer for the small screens that serve as the driving sim’s side mirrors.

Next, head back into the control room. If everything is working, you’ll see the desktops for Host and SimObserver. From here on out, you’ll only need to interact directly with these two computers.

First, on the SimObserver computer, open the program on the desktop called “SimObserver”. This program gives you a live feed of the sim lab. If you’re running a study, this is how you’ll keep tabs on the participants. There are four cameras showing you the inside and outside of the simulator. Additionally, there’s an overlay that provides some live data. You can see what gear the car is in, engine RPM, speed, brake force currently applied, and so on. These can be customized as well if you need something different for a particular study you’re running. SimObserver also handles data collection. We’ll get to that in a future video.

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Back on the Host computer, double-click the “Projectors On” icon on the desktop. You should hear a series of beeps – that’s the projectors turning on.

Next, double click “Steering Calibration”. Steering calibration should be run every time you turn on the simulator. You can watch it happen on SimObserver – the wheel will turn, by itself, through its whole range of motion. Spooky!

Steering calibration is also the first step where you might experience issues. Sometimes the calibration will fail – this tends to happen after power outages, which are more frequent at Longely than you might like. If the calibration fails, head over to those breaker boxes on the other side of the lab.

Open up the front panel of the left box, and find number 22. It’s labeled with some red tape. Flip the breaker off and on again to reset power for the steering wheel. Then, rerun the Steering Calibration.

Next, open up “SimCon”. This program interfaces with the image generators. All you need to do here is go down the list and click “Start” for each IG. You don’t need to hit start for the bottom two – those start automatically.

If everything is working correctly, you’ll see spinning “Realtime Technologies” logos appear on the screens in the sim lab.

Sometimes one of the IGs will fail to start. If this happens, first make sure the associated computer in the rack is turned on. Then, close and re-open SimCon to re-establish the connection between the computers.

Minimize SimCon, and double-click “SimCreator”

SimCreator will ask you for login credentials. The username and password are both administrator, all lower-case.

SimCreator controls much of what happens in the driving simulator. If you’d like to change aspects of how the car controls, the behavior of its self-driving mode, or what data is output during experiments, for example, that can be done through SimCreator. First, click “File”. You can open a SimCreator model from the dropdown list, or click “Open” for the full file explorer. Different models will cause the simulator to behave in different ways. For example, some have the simulator’s motion base disabled – that means the car won’t pitch forward and back when braking, side to side when turning, and so on. If you need to customize the behavior of the simulator for an experiment you’re running, you can create and save a unique SimCreator model. However, we won’t cover that here. SimCreator allows some simple customization of models through its graphical user interface, but in-depth changes require a bit of C++ or JavaScript coding. Additionally, because model components are shared between SimCreator models, changing things in one model can cause other models to break. Proceed with caution!

For now, we’ll just maximize the model we’re currently using.

And click the green “N” to run it. If you’re using the desktop simulator, you can click the green “R” instead. The N simply tells SimCreator that this model is being run across multiple computers – Host, and all the image generators.

SimCreater will ask you to specify a run length. The SimCreater model will automatically stop after however many seconds you put in the box here. Set the RunLength to an arbitrary high number so you aren’t accidentally booted out before you’re done with the simulator.

You should see this box pop up when SimCreator is running.

And on SimObserver, you’ll see that the car is now placed on the grass by some roads. At this point, you can drive the simulator, but nothing much interesting will happen. In the next video, we’ll cover opening and running experiments and scenarios.

For now, we’ll go over shutting the simulator down. It’s essentially the same process as starting it up, but in reverse.

First, hit the red hand icon in SimCreator to stop the model. In all likelihood, a bunch of errors will pop up. They’re nothing to worry about – just hit “OK” on these.

On SimObserver, you’ll see the environment has gone away.

Next, go back to SimCon and repeat the same process as before, but in reverse. Hit “Stop” on each of the IGs, except those bottom two.

Double-click the “Projectors Off” icon on the host desktop to shut down the projectors.

Then, head back to the rack in the other room.

Turn off the amps.

And the computers on the rack.

Finally, turn the main switch from On, to Off.

And with that, the simulator is totally shut down. Please make sure you turn off the lights on your way out!

**2. Loading and Running Experiments**

Welcome to the Connecticut Transportation Safety Research Center Driving Simulator training – Part two!

In this video, we’ll cover loading and running experiments.

Let’s pick up where we left off in the last video-

Here we have SimCreator open on the Host computer. A model is currently running. We want to leave SimCreator running any time we’re doing an experiment, so go ahead and minimize it-

And head back to the desktop.

On the desktop, double-click ExACCT.

ExACCT is used to both design and run experiments. As such, when you open it you’ll be presented with two modes – Developer, and Experimenter. If you were creating an experiment, you’d choose developer. Right now, we’ll choose Experimenter. Experimenter mode allows us to open and run experiments that were created in Devleoper mode, but, crucially, it DOESN’T allow us to edit them. That way, you can freely run experiments with worrying about breaking them by clicking a wrong button. Additionally, experimenter mode allows you to collect data. We’ll cover that in a minute.

When you open ExACCT in experiment mode, you’ll be presented with this blank screen.

Head up to the icons in the top left corner, and click this one to Show the Simulation Control Panel.

The Control Panel should pop up.

The Control Panel is broken into three sections. From top to bottom, we have “Pre-Run Settings”

“Environment Settings”, and “Runtime Control”

In Pre-Run Settings, you can select the experiment and scenario you want to run. Experiments in ExACCT are sort of like folders on a computer – they don’t do anything by themselves, but contain one or more scenario that you can load and run. This is helpful when designing studies that have multiple phases or conditions. For example, you could create an experiment that has one scenario for a warm-up activity, one scenario for a drive with heavy traffic, and one scenario for a drive with light traffic.

Near the bottom of the Pre-Run Settings section, there’s a box where you can enter a Participant ID. ExACCT won’t let you run a scenario without a participant ID. When you enter one, you’ll see the big gray Play Button next to the Experiment and Scenario select drop-downs turn blue. At that point, you can click it and the scenario will run.

Next we have Environment Settings. Here, you can control the time of day and the weather in the simulator. Here you can see the time of day is set to 15:30, or 3:30PM. There’s no wind, and clear skies. Weather in ExACCT is only visual – if you turn on rain, for example, it won’t affect traction on the road. Instead, traction has its own slider in the Environment Settings.

Weather and time of day can also be set up in advance when using ExACCT in developer mode. A scenario can be designed so that it starts snowing automatically five minutes into the drive, for example. This panel in Experimenter mode just gives you live, manual control.

Finally, we have RunTime Control. At the top, RunTime Control will display the experiment and scenario currently selected, the vehicle’s speed, and how long the scenario has been running – this last one is labeled “Simulation Time”. Below, you’ll see a clock with a play button, and a stop sign. When a scenario is running, you’ll see the clock with the play button replaced by a pause button. This allows you to pause a scenario. The stop sign allows you to stop a scenario.

The large box at the bottom of RunTime Control allows you to monitor and activate Maneuvers. Maneuvers is just ExACCT’s way of saying “Things that happen in scenarios”. If you want your participants to be cut off by another car in traffic, there’s a maneuver for that. If you want someone to cross the road in front of them, there’s a maneuver for that. If you want to create traffic, turn on the self-driving mode, change the weather, and so on – there are maneuvers for those too. In Developer Mode, you can set up your scenarios so maneuvers automatically activate at certain times or at certain locations. Additionally, developer mode allows you to designate maneuvers as “Direct Activations”. Direct Activation Maneuvers will then show up here in Experiment mode. You can manually activate these direct activation maneuvers by selecting them in the Runtime Control box, and clicking the lightning bolt icon over to the right. Additionally, this Runtime Control box has a tab labeled “Current Maneuvers”. This allows you to monitor which maneuvers are currently active when running a scenario.

Now let’s try running a scenario!

First, select an experiment from the drop-down box.

Then, select a scenario.

Finally, enter a participant ID and click play.

The Experiment will load, and you’ll see a map of the environment appear back on the main screen.

In this example, we’re running a scenario called Load Models in the experiment Generic World Day. Load Models is a special scenario. Every time you open ExACCT, before you run anything else, make sure you run Load Models. If you try to run other scenarios without running Load Models first, they’re likely to crash or behave in unpredictable ways due to memory constraints. Load Models will take four or five minutes to complete, so if you’re running participants in an experiment, make sure to show up a bit early so you have time to run the Load Models scenario. It can always be found in Generic World Day, but you can also create a copy of it in other Experiments if you want to keep everything you’re using in one place.

Here we have SimObserver open, and you can see Load Models running. Every possible object and actor that can be used in the simulator will spin around in front of the car. Maybe some will give you ideas for experiments to run.

When things stop spinning around the car, return to the Simulator Control Panel on Host. Click the red stop sign to stop the scenario.

A dialogue will appear asking you if you’re sure you want to stop the scenario. Click yes to confirm.

Finally - and this is extremely important – when stopping ANY scenario, hit the stop button – the blue square - in the bottom left corner of SimObserver. If you do not do this, the scenario will be stopped, but SimObserver will still be recording video. This is a great way to fill up SimObserver’s hard drive with unnecessarily large video files.

Now let’s try running something a bit more interesting. We’ll open the scenario Ambient Sparse in Generic World Day. This scenario has the participant starting in a suburban environment with light vehicle and pedestrian traffic.

Hit play, and –

On SimObserver you’ll see the car transported to the starting point of the scenario.

Let’s explore some of the Environment Control options.

We can manually add some snow.

Or change the time of day.

And how about direct activations? In this example, we’ll try the “Smart Cross” maneuver. This will cause a pedestrian to cross the street in front of the participant. Pedestrians in the simulator never cross the street on their own – they only do so when told to by a maneuver. Let’s see how Shanshan fares with Smart Cross.

Close call!

One important note about the simulator – there are no collisions. Even if Shanshan had hit that pedestrian, she would have gone right through him with no visual or other repercussions. Participants can drive through pedestrians, other cars, and buildings with no problem. Allow me to demonstrate by driving like a maniac.

When you’re done with a scenario, hit the stop sign.

And select Yes in the dialogue.

Don’t forget to hit the stop button on SimObserver!

When you’re running scenarios in Experimenter Mode, data collection starts automatically when you hit the play button in the control panel. However, it doesn’t stop automatically.

Make sure you hit the stop button on SimObserver whenever you finish a scenario in Experimenter Mode.

That’s all there is to running experiments! You’ll be a master of the ExACCT experimenter mode in no time. In the next video, we’ll cover how to view and export the data that’s automatically recorded when running scenarios in Experimenter mode.

**3. Viewing and Exporting Data**

Welcome to the Connecticut Transportation Safety Research Center driving simulator training – part three.

In this video, we’re going to learn how to view and export data. You might recall from video number two that data is automatically recorded when using ExACCT in experimenter mode. Now, we’ll take a look at some of that data. Everything you see in this video will be happening on the SimObserver computer – none of the other computers are required to view data.

To view data, you’ll first need to open Data Distillery. This can be found on the SimObserver desktop. Pardon the OBS window I’ve left open.

In Data Distillery, click file

Open

You won’t see anything until you set it to show all file types

Then we can sort by date to find the most recent recordings.

You’ll see that files are named according to the Participant ID and Scenario name that were used in ExACCT. Here, we’re looking at a participant named “Test”, in the scenario “Ambient Sparse”. Each time you run a scenario, four files are produced. There’s a .dat, a .evt, a .log, and a .mpg. In Data Distillery, we just want to open the file with the .dat extension – the other files will be pulled in automatically.

The data will take a second to load

And when it’s finished, the screen will look much like this.

Data Distillery is simple to operate. On the left we have the video recordings from SimObserver, and on the right we have a spreadsheet.

Just above the video, near the top left corner, there’s a play button. Click that and the video will play. On the right, you’ll see that the spreadsheet has started scrolling. The spreadsheet will automatically track with the video.

Using Seek, you can jump to different parts of the video.

And using Playback Speed, you can fast forward, or view things in slow motion.

These are useful if you need to find a specific point in a trial

Here on the spreadsheet you can see some of the data that was automatically recorded by SimObserver. From left to right we have SimTime, longitudinal acceleration, lateral acceleration, throttle pressure, brake pressure, the car’s gear, heading, and so on. Some data elements may only be recorded under certain circumstances. Lane position, for example, will only be recorded if the participant is on a road.

It’s possible to customize what data gets recorded by SimObserver. However, this isn’t done in SimObserver or Data Distillery. To customize the data, you’ll need to dig into SimCreator. We won’t be covering that in this video.

Data Distillery is useful for viewing data, but it doesn’t allow you to perform any real analysis. For that, you’ll need to pull the data you want to use off of the SimObserver computer, and import it into R, Excel, SPSS, or whatever program you prefer. SimObserver doesn’t have an internet connection, so you’ll need to bring an external hard drive or flash drive to the lab to move your data.

All data is stored on SimObserver’s E drive, in a folder helpfully named data.

If you need the video recorded by SimObserver, that’ll be the .mpg file.

If you need the spreadsheet, that’ll be the .dat file.

If we open the .dat file in notepad, we’ll see that it’s just in a tab delimited plain text format. You’ll have to check that whatever program you’re using for analysis can read tab delimited files. If not, you can just open it Excel, and save it as an excel file or a csv. Usually there’ll be some junk rows at the top of the file you’ll need to delete.

To help you along with analysis, I’ve created two R scripts that you’re free to use and customize. These originated from an experiment that involved SimDriver – the simulator’s autonomous vehicle mode. You can find them in the github repository at CTSRC.Link/DrivingSimRepo.

The first R script takes those SimObserver spreadsheets and uses them to generate response time data. It looks for the activation of maneuvers in the time series data, finds the first instance of SimDriver deactivation following each maneuver, and uses the difference to calculate a driver response time.

It’ll leave you with much cleaner data that looks like this. You’ll see blank cells when the participant didn’t deactivate SimDriver in response to a maneuver.

The second R script will give you the occurrence of SimDriver use in a given trial. This one is much simpler – it’ll leave you with a spreadsheet that looks like this.

Where you have the duration of each trial, the percentage of time during that trial spent with SimDriver engaged, and the percentage of time spent in manual control of the car.

Finally, there’s a third script to convert these outputs from long to wide format, which you might want if you’re running your analysis in SPSS or SAS.

Again, these can be found at CTSRC.Link/DrivingSimRepo

That’s all there is to viewing and exporting data. You may want to poke around in Data Distillery yourself – there are several options not addressed in this video. I’ve just covered some of the basics – the details will all depend on what kind of study you want to run.

In the next video, we’ll cover creating experiments and scenarios. See you then!

**4. Creating Experiments**

Welcome to the Connecticut Transportation Safety Research Center driving simulator training – part four. You’ve reached the end of the line!

In this training, we’ll cover the basics of creating experiments and scenarios in ExACCT.

First, turn on the simulator using the steps from Training Video #1. You’ll need to make sure you have SimCon and SimCreater up and running before you can design an experiment.

Double-click ExACCT on the Host desktop. Now, things take a turn. If you were simply running an experiment, you’d go into Experimenter mode. But since we’re creating an experiment, we’ll go into Developer mode instead. This will give us full access to ExACCT’s capabilities.

Developer mode will open with this blank screen. It should read “No experiment loaded” at the bottom of the center window. At this point, you could load in an existing experiment by going to “File”, and then “Load”. However, in this example we’re going to create an experiment from scratch. To do that, click on “File” and then “New Experiment”.

You’ll be presented with this intimidating-looking window of configuration options.

At the top, you’ll be asked to name your experiment. Try to use something more informative than “New Experiment”.

Then, you’ll have to tell ExACCT where it can find all the files it’ll need to assemble an experiment. Fill in the boxes like so. You may want to pause here for a minute to copy down directory and file names. You can also view the configuration of an existing experiment to use as a reference when creating a new one.

As mentioned in a previous video, Experiments in ExACCT don’t do anything by themselves – they’re mainly just containers for Scenarios. To create a scenario in your experiment, click on this icon next to the drop-down box.

And enter a name for your new scenario.

You should see this window appear. This is where you can edit the contents of scenarios. This will determine what participants are actually doing in your experiment.

The first thing you’ll need to do is establish a start point.

To do that, first click on this icon with the two green flags in the top left corner.

Then, click somewhere on the map below to set the start point. This start point is where the car will be whenever you’re starting the scenario, so it’s important to consider how this will affect participants. Keep in mind that scenarios always begin with the car at a stop, so it can be awkward to place the start point in the middle of a highway, for example.

To make sure we’re not starting our scenario in an awkward spot, let’s zoom in.

14. You can use the mouse scroll wheel to zoom slowly. If you want to zoom to a specific spot, click this magnifying glass icon to zoom. This will allow you to draw a box on the area you want to zoom to.

15. Now we can see the exact position of our starting point. You probably don’t want it in the left lane of a highway – instead, try moving it to the shoulder.

16. But to make things a bit more convenient, for the rest of this tutorial we’ll have the start point down here, near a highway on ramp.

17. After you’ve placed your start point, you’ll need to determine the route that participants will drive. Participants can deviate from the route at any time in the scenario. However, this will cause certain aspects of the scenario to not function correctly. The importance of keeping participants on-route will likely depend on the specific goals of your study. You may want to give participants directions before a scenario begins so they can follow the correct route.

18. To start drawing your route, click the icon here that looks like a road.

19. Then, click on the road where you want the route to start.

20. Let’s zoom out so we can draw a longer route.

21. If you place your mouse cursor on the road, you’ll see that ExACCT will attempt to draw a route to that point. The route is indicated by this light green highlighting. ExACCT isn’t very good at this, so you’ll probably want to draw your route in small chunks to make sure it goes exactly where you want it.

23. If you left click the mouse on the road, the route will be established up to that point. You can then keep clicking along the road to extend it.

24. When you’re done, click the road icon again to stop drawing the route.

25. When you stop drawing the route, it will only be saved up to the last point you clicked. Make sure you you actually click where you want the route to end.

26. If you want to edit your route once it’s drawn, click on the road icon again.

You can use this icon on the far right to delete chucks of your route starting from the end point.

27. And then you can draw the route back if need be.

28. Let’s assume you want things to actually happen along this route you’ve drawn. To accomplish that, we’ll need to add some maneuvers.

29. Click this toolbox icon to open the window for maneuvers.

31. Here you can see all the currently available maneuvers in ExACCT. As mentioned in the previous video, maneuvers are just ExACCT’s name for events that happen in a scenario. Traffic, weather, pedestrians, behavior of other cars, and so on can all be controlled by maneuvers. You can also modify existing maneuvers, or create entirely new ones, if none of the current maneuvers work for your study design.

32. It’s obvious based on the name what some maneuvers will do, but others are more obscure. If you want to figure out what a maneuver does, double click on it in the list to open up its parameters.

33. And then click “Show Maneuver Documentation” to view information about the maneuver.

34. Let’s add some traffic to our scenario. We can do that easily with the “Ambient Traffic” maneuver. This one generates traffic with no special behaviors – the participant will just see other vehicles around them.

35. Double-click Ambient Traffic in the list to see its parameters.

36. Every maneuver in ExACCT has a different set of parameters you can edit. For Ambient traffic, we can set the direction of the traffic, how frequently new cars are spawned into the environment, the radius around the participant’s car in which traffic will be generated, the types of vehicles included in the traffic, and the general behavior of the traffic – normal, aggressive, and so on.

37. Click okay, and you’ll see that the words Ambient Traffic have appeared beneath the existing Ambient Traffic in the list of maneuvers. This new ambient traffic in the list is the maneuver with the parameters specified in the previous window. You might want to name your maneuvers with something more creative – we could have called this “Ambient Traffic Light”, for example. Every time you click on the original “Ambient Traffic” in the list, you’ll see the same parameter setting window. This way, you can create more than one of the same maneuver. For example, we could create a second instance of the Ambient Traffic maneuver with different parameters and call it “Ambient Traffic Heavy”, and then use both the light and heavy versions of Ambient Traffic at different points in the scenario.

38. However, the instance of Ambient Traffic we just created won’t do anything until we add it to the scenario. There are three ways you can add maneuvers to scenarios. First, you can add them as direct activations. This will give you manual control over the maneuver’s activation when running the scenario in experimenter mode. Second, you can add them on a timer. This allows you to have maneuvers activate automatically at predetermined times. For example, we can have the traffic start thirty seconds into the scenario. Finally, you can add them to the route. This allows you to have maneuvers activate automatically when the participant reaches a certain location. However, this is assuming that the participant is actually following your route. There are also some finicky aspects of location-based maneuvers that we’ll cover in a minute.

39. To set up your maneuver as a direct activation, first click on the instance of the maneuver you’ve created.

And then click this button below to add it as a direct activation.

You’ll see it appear in the list of direct activations back on the main ExACCT window.

And if you don’t want it as a direct activation anymore, click this button to remove it.

40. To set it up as a timed maneuver, click it in the list and drag it over to the stopwatch icon.

You’ll be asked to name it and set a time. Ambient traffic will run continuously once it starts. Sometimes you may want the same maneuver to happen more than once in a scenario. You can use the same maneuver multiple times if you want – you should just make sure they have different names. These names are separate from the maneuver names in the list to the right. For example, if we had named this as “Ambient Traffic Light”, and also created an “Ambient Traffic Heavy”, we could set it so Ambient Traffic Light 1 starts at 30 seconds, Ambient Traffic Heavy starts at 180 seconds, and Ambient Traffic Light 2 starts at 600 seconds. This way you can reuse the same parameter sets.

41. Maneuvers on timers will show up back on the main scenario editing window. You can delete them or change their timing here if need be.

42. Now let’s add some weather to our scenario. We’ll do this on a timer as well.

43. Double click the weather maneuver.

And you’ll see the weather parameters we can adjust.

We’re going to try out a blizzard, so let’s name this instance Weather – Blizzard.

We can select the appropriate weather option from the drop down, and click okay to add it.

44. Then drag it to the timer,

45. And set it to start at 0 – the Blizzard will begin right at the start of the scenario.

47. If you want to use the SimDriver self driving mode in your study, you need to make sure to include the SimDriver maneuver. Create an instance of the SimDriver maneuver, and set it on a timer for 0 seconds so the self-driving mode will work from the beginning of the scenario.

48. Some maneuvers, like weather and traffic, will make sense to have on timers. Others you may want to have activate at a fixed location. Let’s try that out with the SmartCross maneuver. SmartCross will cause a pedestrian to cross the road in front of the participant.

49. SmartCross has several options – we can change the pedestrian’s speed, how far away they’ll appear, what kind of model will be used for the pedestrian, and more.

For this tutorial, we’ll have a dog cross the road.

And this dog will come out from behind a “Nissan Truck with Machine Gun and Gunner”. What’s he doing back there? Some things will forever be a mystery.

50. To set the location of our smartcross instance, click it in the toolbox list and drag it over to the route on the scenario editing window. A red dot will appear on the route where the maneuver is located. If you hover on it, you’ll see the name of the maneuver you just added. It will also appear in the list of maneuvers over on the right.

51. Here’s one thing you might want to try out with location-based maneuvers. Even though maneuvers appear in ExACCT, they *are not automatically recorded* in the data distillery spreadsheets when collecting data. This can cause problems if you need to know exactly where or when a maneuver occurred in your study without hand-coding it from the video recordings. To help with this, I’ve created a special maneuver called “Maneuver Flag”. Maneuver Flag doesn’t do anything in the scenario itself.

52. You can drop it as a location-based maneuver, and from the participant’s perspective, nothing will be changed. All it does is create a marker in the data distillery spreadsheet. Here, I’m dropping ManeuverFlag right on top of SmartCross. This way, when the participant hits the smart cross maneuver, a “1” will appear in the User1 column of the data distillery spreadsheet. Otherwise, the column will contain 0s. This is handy if you want to quickly calculate reaction times to location-based maneuvers, or simply know when a participant hit a given part of the route without referring back to the video recordings.

53. Now that we have smartcross and maneuverflag in place, let’s see how a participant fares. Today we have Shansahn behind the wheel. She’s been instructed to turn right onto the highway, where the dog should cross the road in front of her.

55. Looks like Shanshan missed her turn due to the blizzard. When using weather in your scenarios it’s important to do plenty of testing to ensure the level of visibility you want.

56. We can watch the scenario running back on Host as well. Look at the panel on the left side of the screen – you’ll see the words “moveRoutePosition – not on the route!” This is ExACCT complaining that Shanshan is no longer on the route, and our location-based maneuvers will not work. Let’s stop the scenario and fix that.

57. First we’ll remove the blizzard by clicking it in the list of maneuvers and hitting the delete key.

58. Next we’ll move the smartcross maneuver closer, so we don’t have to worry about participants missing a turn.

59. Let’s see how Shanshan fares now.

60. She’s passed the location where we put the maneuver, and there’s no sign of a dog. Time for more troubleshooting!

61. It could be that we put out start point too close to the maneuver. Let’s try adjusting the SmartCross parameters.

62. To do that, we open up the toolbox and find the instance of the smartcross maneuver we made earlier.

63. Double click on it to show the maneuver parameters. SmartCross has a parameter called “Trigger Distance” let’s try reducing that. Hit okay to save the new parameter set.

64. We’ll also move smartcross back a bit to give some extra space for it to trigger.

65. Let’s give that a try. This time, I’m back behind the wheel!

66. You can see I’m merging onto the highway.

67. But again, it seems like SmartCross didn’t trigger. Let’s check ExACCT to find out what kind of error might be causing this.

68. Here’s the problem – “Populate distance ahead was too close for the driver’s speed on enter. Canceling maneuver.” It looks like when we reduced the trigger distance for SmartCross, it was actually too short for highway speeds. We’ll have to increase the trigger distance again to compensate. Location-based maneuvers require extensive testing to work out these kinds of quirks.

69. Here I’m back on the highway. The smartcross trigger distance has been set back to its original value.

70. And there’s the dog! A smartcross success.

71. We can see that smartcross worked from ExACCT as well. Check that window on the left again – “Actor path traversal complete.”

72. Now let’s stop the scenario with the stop sign button.

73. We have a working scenario, but if we look in the dropdown box at the top we can see that it’s the only scenario in this experiment. If you want to create a second scenario in the same experiment, you can select “New Experiment” from the drop down, or hit the new scenario button to the right.

74. We also have buttons to edit the current scenario – that just opens the window we were using before.

Remove scenario – which we certainly don’t want to use after all that work.

75. And import scenario, which allows us to bring scenarios from other experiments into this one. Let’s give that a try.

76. You may recall from the video on running experiments that any time you want to run a scenario in ExACCT’s experimenter mode, you should run the LoadModels scenario first. Using Import Scenario, we can add Load Models to this experiment to make that more convenient.

77. Click Import Scenario, and scroll down to the experiment that contains the scenario you want to import. In this case, we’re looking for Generic World Day, since we know it contains a copy of Load Models.

78. Double click it, and you’ll be presented with a list of all the scenarios in that experiment.

79. Click load models, and hit okay. You’ll see the scenario pop up in the scenario editor window.

80. And if we check the drop down box, we’ll see Load Models is now in this experiment along with the Test Scenario we just created.

81. With that, this experiment should be ready to run!

82. Before you exit ExACCT, make sure you go to File, and click Save Experiment.

83. After you exit ExACCT, shutting down the simulator is the same as always. Stop the SimCreator model, Turn off the IGs in SimCon, Turn off the projectors, turn off the computers, and turn off the main power switch.

84. This marks the end of these tutorial videos. There’s a lot more to explore, but hopefully at this point you understand the basics. Thank you for listening!