

MiniSim Data Acquisition Cell Definitions

The data collection requirements for the simulator are listed in the following table.

CSSDC = Change State Signal Data Collection, and indicates that data is collected only when the state changes.

Definition	NADS Var Name	Units/Values	Collection Freq
Accelerator pedal position	CFS_Accelerator_Pedal_Position	Normalized value between 1 and 0	60 Hz
Auto Transmission Mode	CFS_Auto_Transmission_Mode	-2 = Park -1 = Reverse 0 = Neutral 1 = First 2 = Second 3 = Drive 4 = Overdrive	CSSDC
Brake pedal force	CFS_Brake_Pedal_Force	Pounds	60 Hz
Brake pedal position	CFS_Brake_Pedal_Position	Radians of actuator movement	60 Hz
Radio status	CIS_Entertainment_Status	See Table 3, at the end of this section, for details on this variable	CSSDC
Steering wheel angle	CFS_Steering_Wheel_Angle	Degrees	60 Hz
Steering wheel angle rate	CFS_Steering_Wheel_Angle_Rate	Degrees/sec	60 Hz
Steering wheel torque	CFS_Steering_Wheel_Torque	Foot-pounds	60 Hz
Transfer case mode	CFS_Transfer_Case_Mode	1 = 2H 2 = 4H 3 = Neutral 4 = 4L Generally defaults to 3 but hardcoded to 1 for CTB	CSSDC
Auxiliary buttons	CIS_Auxiliary_Buttons	4 floats for buttons 1 to 4. 0 = button is not pressed, 1 = button is pressed. button 1 is the left wheel button (left vigilance button), and button 2 is the right wheel button (right vigilance button).	60 Hz
Joystick type	CIS_Joystick_Type	1 short, 0 = ECCI hybrid with analog shifter stalk, 1 = MicroSoft Generic, 2 = Logitech gamepad, 3 = Logitech G25 wheel, 4 = HAPP board hybrid wheel with analog shifter stalk, 5 = Logitech Wingman Formula GP, 6 = Logitech G27 wheel, 7 = ECCI original wheel with paddle shifter	CSSDC
Joystick Buttons	CIS_Joystick_Buttons	1 integer Combined joystick button press values in bitmap form. Paddle shifter paddles are buttons so their values are reflected here as well.	CSSDC
Cruise Control state	CIS_Cruise_Control	0 – Not available 1 – off 2 – On 3 – Set/Accel 4 – Resume 5 - Coast	CSSDC
Car horn	CIS_Horn	1 – off 2 - on	CSSDC
Turn signals	CIS_Turn_Signal	1 – no turn signal on 2 – left turn signal on 3 – right turn signal on 4 – hazard signals on	CSSDC
Increments every time the Audio trigger fires	SCC_Audio_Trigger	Integer, begins simulation at 0	CSSDC
Parameters for Data Reduction	SCC_DataRed_Params	ASCII #	60 Hz

Segments			
Data Reduction Segment Type	SCC_DataRed_Segments	Integer ≥ 0	60 Hz
Bit mask of Audio and Visual states	SCC_DynObj_AudioVisualState	2 integers	60 Hz
Scenario object's color index	SCC_DynObj_ColorIndex	Integer 1 - 5	60 Hz
Cved IDs of Scenario Objects	SCC_DynObj_CvedId	Integer ≥ 0	60 Hz
Indicates how many valid objects in SCC_DynObj Array	SCC_DynObj_DataSize	integer	60 Hz
Scenario object's HCSM Type	SCC_DynObj_HcsmType	integer	60 Hz
Headings of Scenario Objects	SCC_DynObj_Heading	degrees	60 Hz
Name of scenario object	SCC_DynObj_Name	array of char	60 Hz
Position of scenario object	SCC_DynObj_Pos	feet	60 Hz
Roll and Pitches of Scenario Objects	SCC_DynObj_RollPitch	degrees	60 Hz
Sol IDs of Scenario Objects	SCC_DynObj_SolId	Integer ≥ 0 , it is the order in which the different objects are listed within the sol2.txt file	60 Hz
Velocities of Scenario Objects	SCC_DynObj_Vel	ft/s for DDOs (HcsmType = 1) m/s for ADOs (HcsmType = 10)	60 Hz

Definition	NADS Var Name	Units/Values	Collection Freq
Status of an event	SCC_EventStatus	0/1. 0 means no event is active. 1 means there is an active event. Needs to be set to 1 at least once to indicate the drive has started and run time data reduction, including those overall evaluations and sliding window based evaluations, should be started.	CSSDC
Index of an event	SCC_EventNumber	1..20. A maximum of 20 events can be defined.	CSSDC
Time since drive started.	SCC_Eval_Exec_Time	Seconds. The clock starts the first time SCC_EventStatus is set to 1.	CSSDC
Total number of collisions	SCC_Eval_Collisions	Total number of collisions so far in the drive (i.e. from when the event status is set to 1 for the first time).	CSSDC
Maximum own vehicle speed	SCC_Eval_Max_Speed	MPH. Maximum own vehicle speed so far.	CSSDC
Average OV speed	SCC_Eval_Avg_Speed	MPH	CSSDC
Standard deviation of OV speed	SCC_Eval_SpeedSD	MPH	CSSDC
Standard deviation of OV lane position	SCC_Eval_Overall_SDLP	Feet	CSSDC
Total number of OV lane departures	SCC_Eval_Lane_Departures	Lane departures as the LDW system indicates.	CSSDC
Percentage of time when the OV is considered departed from the lane	SCC_Eval_Lane_Departure_Pct	0% -- 100%	CSSDC
Total number of occasions when the OV is 5MPH or more above the speed limit	SCC_Eval_Speedings	There is a debounce time of 30 seconds. So within 30 seconds the count won't increase even if the OV violates the speed limit multiple times during that time span.	CSSDC
Percentage of time when the OV is 5MPH or more above the speed limit	SCC_Eval_Speeding_Pct	0% -- 100%. Debounce time is not used here. It's the actual frame count when the OV violates the speed limit measured against the total frame count of the drive so far.	CSSDC
Average distance between OV and a lead vehicle	SCC_Eval_Avg_Hdwy	Feet. The distance is only averaged among the frames when there is a lead vehicle as reported by the scenario controller.	CSSDC
Number of collisions during an event.	SCC_Eval_Event_Collisions	An event is defined by SCC_Event_Status and SCC_Event_Number. The status needs to be 1 and the number needs to be between 1 and 20.	CSSDC
Maximum OV speed during an event.	SCC_Eval_Event_Max_Speed	MPH	CSSDC
Minimum OV speed during an event	SCC_Eval_Event_Min_Speed	MPH	CSSDC
Average OV speed during an event	SCC_Eval_Event_Avg_Speed	MPH	CSSDC
Standard deviation of OV speed	SCC_Eval_Event_SpeedSD	MPH	CSSDC

during an event			
Standard deviation of OV lane position during an event	SCC_Eval_Event_SDLP	Feet	CSSDC
Number of OV lane departures during an event	SCC_Eval_Event_Lane_Departures		CSSDC
Percentage of time when the OV is considered departed from the lane during an event	SCC_Eval_Event_Lane_Departure_Pct	0% -- 100%	CSSDC
Number of occasions when the OV is 5MPH or more above the speed limit during an event	SCC_Eval_Event_Speedings	See remarks for SCC_Eval_Speedings.	CSSDC
Percentage of time when the OV is 5MPH or more above the speed limit during an event	SCC_Eval_Event_Speeding_Pct	0% -- 100%. See remarks for SCC_Eval_Speeding_Pct.	CSSDC
Average distance between the OV and a lead vehicle during an event	SCC_Eval_Event_Avg_Hdwy	Feet. See remarks for SCC_Eval_Avg_Hdwy.	CSSDC

Definition	NADS Var Name	Units/Values	Collection Freq
lengths of windows preceding the current frame, to be used for run time data reduction	SCC_Eval_Window_Duration	Seconds. A total of 10 windows of different duration can be defined. There is a build up time for the window at the start of the drive as data are being filled in the windows. The length of the build up time is the same as the length of the window. The values during the build up time should be discarded.	CSSDC
Number of collisions in a window of predefined duration preceding the current frame	SCC_Eval_Window_Collisions		CSSDC
Average OV speed in a predefined window	SCC_Eval_Window_Avg_Speed	MPH	CSSDC
Standard deviation of OV speed in a predefined window preceding the current frame	SCC_Eval_Window_SpeedSD	MPH	CSSDC
Standard deviation of OV speed in a predefined window preceding the current frame	SCC_Eval_Window_SDLP	MPH	CSSDC
Number of OV lane departures in a predefined window preceding the current frame	SCC_Eval_Window_Lane_Departures		CSSDC
Percentage of time when the OV is considered departed from the lane in a predefined window preceding the current frame	SCC_Eval_Window_Lane_Departure_Pct	0% -- 100%	CSSDC
Number of occasions when the OV is 5MPH or more above the speed limit in a predefined window preceding the current frame	SCC_Eval_Window_Speedings	See remarks for SCC_Eval_Speedings.	CSSDC
Percentage of time when the OV is 5MPH or more above the speed limit in a predefined window preceding the current frame	SCC_Eval_Window_Speeding_Pct	0% -- 100%. See remarks for SCC_Eval_Speeding_Pct.	CSSDC
Average distance between the OV and a lead vehicle preceding the current frame	SCC_Eval_Window_Avg_Hdwy	Feet. See remarks for SCC_Eval_Avg_Hdwy.	CSSDC
Average angular velocity rate of gaze angle in a predefined window preceding the current frame	SCC_Eval_Window_Gaze_Avg_AnguRate	Radians/Second. See remarks for SCC_Eval_Gaze_AnguRate.	CSSDC
Standard deviation of angular velocity rate of gaze angle in a predefined window preceding the current frame	SCC_Eval_Window_Gaze_AnguRateSD	Radians/Second. See remarks for SCC_Eval_Gaze_AnguRate.	CSSDC
Current angular velocity vector of the gaze angle	SCC_Eval_Gaze_AnguVel	Radians/Second. This is calculated from the eye tracker real time gaze rotation angle of the first eye, ET_gaze_rot_unfiltered[0] and ET_gaze_rot_unfiltered[1], representing pitch and yaw angle of the first eye, respectively. In the 240Hz DAQ file there will be a delay of 4 to 8 frames between the gaze angles and the angular velocity calculated from them.	CSSDC
Magnitude of the current angular velocity vector of the gaze angle	SCC_Eval_Gaze_AnguRate	Radians/Second. This is a scalar value, the length of the gaze angular velocity vector.	CSSDC

Definition	NADS Var Name	Units/Values	Collection Freq
Lead vehicle follow data	SCC_Follow_Info	An array of 9 floats 1st - identifier of object -1 if none or error 0 if no ownvehicle 2nd - distance to lead vehicle (in feet) 3rd - bumper-to-bumper time to lead vehicle (in seconds) 4th - bumper-to-bumper distance to lead vehicle (in feet) 5th - time-to-collision (in seconds) 6th - lead vehicle velocity (ft/s) 7th - x coordinate of lead vehicle 8th - y coordinate of lead vehicle 9th - z coordinate of lead vehicle	60 Hz
Scenario object's HCSM Type	SCC_DynObj_HcsmType	integer	60 Hz
Deviation of OV from center of lane	SCC_Lane_Deviation	Array of 4 floats 1st: -1 (on a crdr) 1 (on a lane) 0 (error) 2nd: offset from the center of lane/corridor 3rd: width of lane (corridor's width is not reported) 4th: Lane/corridor CVED id	60 Hz
Scenario set values	SCC_LogStreams	See section 6.2 for specifics	60 Hz
Over speed limit accumulation	SCC_Over_Speed_Limit	Integer >= 0	60 Hz
Road curvature of Own Vehicle's current position	SCC_OwnVeh_Curvature	Float >= 0	60 Hz
Pitch of the driver, in scenario coordinates.	SCC_Scen_Pos_Hex_Pitch	Degrees	CSSDC
Roll of the driver, in scenario coordinates.	SCC_Scen_Pos_Hex_Roll	Degrees	CSSDC
X position of the driver, in scenario coordinates.	SCC_Scen_Pos_Hex_X	Feet	CSSDC
Y position of the driver, in scenario coordinates.	SCC_Scen_Pos_Hex_Y	Feet	CSSDC
Yaw of the driver, in scenario coordinates.	SCC_Scen_Pos_Hex_Yaw	Degrees	CSSDC
Z position of the driver, in scenario coordinates.	SCC_Scen_Pos_Hex_Z	Feet	CSSDC
Turntable position of the driver, in scenario coordinates.	SCC_Scen_Pos_TT	Degrees	CSSDC
X Crossbeam position of the driver, in scenario coordinates.	SCC_Scen_Pos_X_Crossbeam	Inches	CSSDC
Y Carriage position of the driver, in scenario coordinates.	SCC_Scen_Pos_Y_Carriage	Inches	CSSDC
Total number of increments collected at 60 Hz	SCC_Total_Speed_Limit	Integer >= 0	60 Hz
Under speed limit accumulation	SCC_Under_Speed_Limit	Integer >= 0	60 Hz
Within speed limit accumulation	SCC_Within_Speed_Limit	Integer >= 0	60 Hz
Type of surface the tire is in contact with	TPR_Surface_Tire_Friction_Ind	0 - Intersections and drivable off-road 14 - Road 20 - Shoulder	CSSDC
Flag to enable/disable ABS system	VDS_ABS_Operating_Flag	0 - ABS system disabled 1 - ABS system enabled	CSSDC
Acceleration pedal position backdrive	VDS_Acc_Pedal_Pos_Backdrive	NA	60 Hz
The brake torque at each wheel	VDS_Brake_Torque	Newton-meter	60 Hz
VDS filtered version of CFS Brake Pedal Force	VDS_BrkPdl_Fr_Fltrd	Pounds	60 Hz
Chassis CG Acceleration	VDS_Chassis.CG_Accel	Feet/sec*sec	60 Hz
Chassis CG angular velocity	VDS_Chassis.CG_Ang_Vel	Deg/sec	60 Hz

Definition	NADS Var Name	Units/Values	Collection Freq
Chassis CG orientation	VDS_Chassis.CG_Orient	degrees	60 Hz
Chassis CG position	VDS_Chassis.CG_Position	feet	60 Hz
Chassis CG velocity	VDS_Chassis.CG_Vel	mph	60 Hz
Coefficient of friction currently being used by dynamics	VDS_Coeff_Fric	Terrain type 14 – 0.50 Terrain type 20 – 0.65 Terrain type 0 – 0.65 Terrain type 25 – 0.50	60 Hz
Eye point orientation in global coordinate system	VDS_Eyepoint_Orient	Degrees	60 Hz
Eye point position in global coordinate system	VDS_Eyepoint_Pos	feet	60 Hz
Angular velocity of head point	VDS_Head_Pt_Angular_Vel	Deg/sec	60 Hz
Head point specific forces	VDS_Head_Pt_Specific_Force	G's	60 Hz
Wheel torque due to external forces	VDS_Load_Torque	Foot-pounds	60 Hz
Number of grids used for each contact patch	VDS_Num_Grids	NA	CSSDC
Number of tires on vehicle	VDS_Num_Tires	0 -10	60 Hz
Commanded Steering Wheel Torque	VDS_Steering_Torque_Backdrive	Foot-pounds	60 Hz
The tire/terrain contact location	VDS_Tire_Ground_Contact	In feet, a vector with two elements (x,y) for each tire, representing the point where the tire contacts the ground. The tires are listed with front right first, front left second, rear right third, rear left fourth.	60 Hz
Tire rotational velocity	VDS_Tire_Rot_Vel	Degrees/sec	60 Hz
Tire slip angle	VDS_Tire_Slip_Angle	Degrees	60 Hz
Tire slip ratio	VDS_Tire_Slip_Ratio	0 – 1 norm	60 Hz
Tire weight on wheels	VDS_Tire_Weight_On_Wheels	Pound force	60 Hz
Engine revolutions per minute	VDS_Veh_Eng_RPM	Rpm	60 Hz
Engine torque	VDS_Veh_Eng_Torque	Foot-pounds	60 Hz
Vehicle heading	VDS_Veh_Heading	Degrees	60 Hz
Vehicle speed	VDS_Veh_Speed	Mph	60 Hz
Transmission revolutions per minute	VDS_Veh_Trans_RPM	RPM	60 Hz
Commanded Vibration Forces	VDS_VibrForce	G's	60 Hz
Heading angle of wheel	VDS_Wheel_Center_Heading	Degrees	60 Hz
Translational velocity of wheel center	VDS_Wheel_Center_Velocity	Ft/sec	60 Hz
Wheel spin	VDS_Wheel_Spin	Rad/sec	60 Hz
Rotational position of tire, in radians	VDS_Wheel_Spin_Angle	Rad	60 Hz
Road wheel angle	VDS_Wheel_Steer_Angle	Rad	60 Hz
ESC on icon	VVS_Right_Warning_Light	1 – off, 2 - on	CSSDC
Speedometer backdrive	VVS_Speedometer_Backdrive	mph	60 Hz
Drive File Frame No.	VDS_DRV_Frame_No	1 integer	60 Hz
Drive File Joystick Type	VDS_DRV_Joystick_Type	1 short	CSSDC
Drive File Steering Wheel Angle	VDS_DRV_Steering_Wheel_Angle	1 float	60 Hz
Drive File Steering Wheel Angle Rate	VDS_DRV_Steering_Wheel_Angle_Rate	1 float	60 Hz
Drive File Transmission Gear	VDS_DRV_Transmission_Gear	1 short	CSSDC
Drive File Auto Transmission Mode	VDS_DRV_Auto_Transmission_Mode	1 short	CSSDC
Drive File Accelerator Pedal Position	VDS_DRV_Accelerator_Pedal_Position	1 float	60 Hz
Drive File Brake Pedal Force	VDS_DRV_Brake_Pedal_Force	1 float	60 Hz
Drive File Joystick Buttons	VDS_DRV_Joystick_Buttons	1 integer	CSSDC
Drive Mode	SOP_DriveMode	1 short, 0 = regular drive, 1 = recording, 2 = playback	CSSDC
Playback File Name	SOP_PlaybackFileName	256 chars, name of the playback file. The file is in binary format and its name has an extension of ".drv".	CSSDC

