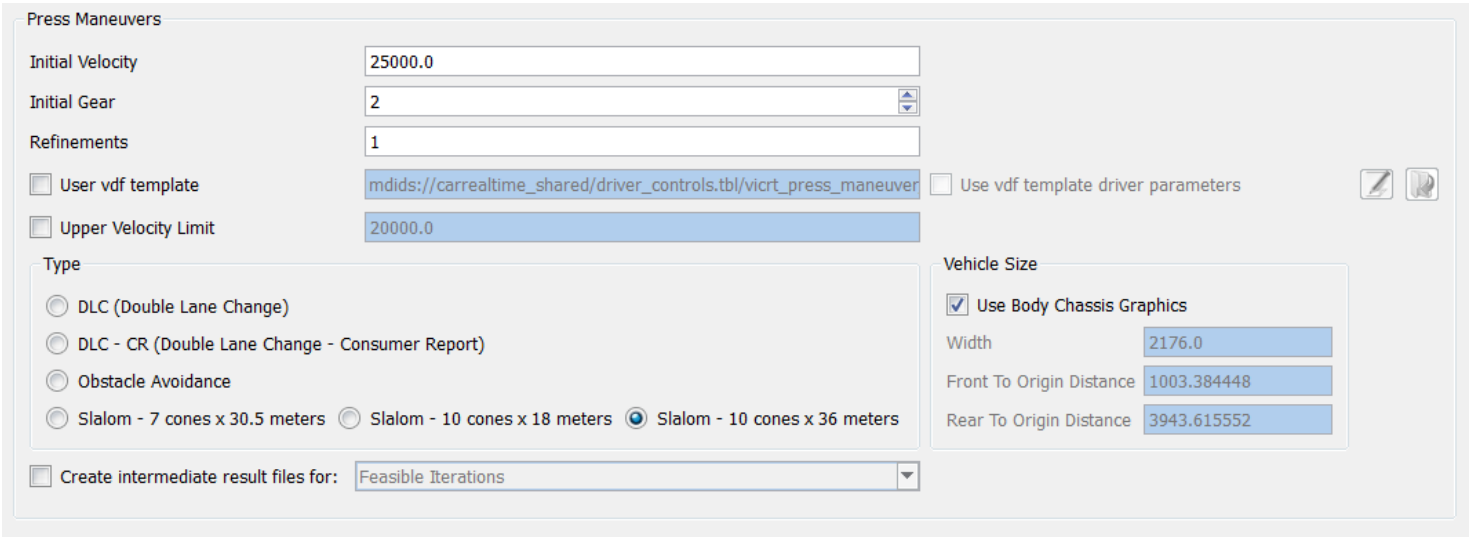
Press Maneuvers

Press Maneuvers event is used to simulate different types of maneuvers.
The purpose of the event is to use VI-Driver to have the vehicle going through the cones at maximum speed available.
The event is not expected to have the vehicle following a specific trajectory precisely.
The reference driver line is simply used to create the desired history of vehicle dynamics.
Given the vehicle data and event type, cones are placed in the track and a genetic algorithm is used to generate target trajectories which will be submitted and verified during the dynamic integration, having a constant vehicle velocity as longitudinal dynamics target. For each iteration, cone interference check is used to verify if the target trajectory is feasible.
When the full set of trajectories have been verified, velocity is increased and a new cycle begins. Depending on the required refinements, a different number of generation is used by the genetic algorithm involved in the trajectory creation process.

The event is completed when a single combination of trajectory and velocity (maximum) is identified featuring a no cone hit situation.

The key aspects of the event are:

- *Learning*: collect data from vehicle dynamics.
- *Adapting*: using information coming from previous trials, updating the trajectory and pushing the speed.



The parameters of the events are:

- **Initial Velocity**
  Initial velocity for first iteration.

- **Initial Gear**
  Event gear for first iteration.

- **Refinements**
  specify the number of generations to be used by the genetic algorithm.

- **User vdf template**
  toggle button which enables the usage of a vdf template file (vdf_tpl) for customizing the driver parameters and tasks. The user is allowed to tailor the vdf_tpl with his own requirements.

  The template file is a standard vdf file with some specific placeholders used as simulation parameters:

  - >>*REPLACE_INIT_SPEED*<<, used by press maneuver event to set the initial speed;
  - >>*REPLACE_INIT_GEAR*<<, used by press maneuver event to set the initial gear;
  - >>*REPLACE_ABORT_TIME*<<,used by press maneuver event to set the maneuver abort time;
  - >>*REPLACE_DRD_FILE*<<, used by press maneuver event to set the name of the drd file containing the reference path and the calculated speed profile.

```
$-------------------------------------------------------------------VIGRADE_HEADER
[VIGRADE_HEADER]
FILE_TYPE = 'VDF'
FILE_VERSION = 9
FILE_FORMAT = 'ASCII'

[...]

$-----------------------------------------------------------------------------STARTUP
[STARTUP]
STARTING_TIME = 0
INITIAL_SPEED = >>REPLACE_INIT_SPEED<<
INITIAL_STEERING = 0
INITIAL_THROTTLE = 0
INITIAL_BRAKING = 0
INITIAL_BRAKING2 = 0
INITIAL_GEAR = >>REPLACE_INIT_GEAR<<
INITIAL_CLUTCH = 0
INITIAL_SETUP = 'STANDARD'
$-------------------------------------------------------------------MANEUVERS_LIST
[MANEUVERS_LIST]
{ name  abort_time  sampling_step   }
'MANEUVER_1' >>REPLACE_ABORT_TIME<< 0.01
$-------------------------------------------------------------------MANEUVER_1
[MANEUVER_1]
TASK = 'STANDARD'
CONTROLLER_SETTINGS = 'CONTROLLER_STANDARD'

[...]

(MACHINE)
PATH = 'MANEUVER_1_PATH'
SPEED = 'MANEUVER_1_SPEED'
(OPTIONS)
FOLLOW_TARGET_SPEED = 'TRUE'
SPEED_MAP_ABS_TIME = 'FALSE'
SPEED_MAP_GLOBAL_S = 'FALSE'
CONNECT_PATH = 'TRUE'
END_OF_PATH_CHECK = 'TRUE'
PATH_POSITIONING = 'ABSOLUTE'
$-------------------------------------------------------------MANEUVER_1_PATH
[MANEUVER_1_PATH]
TYPE = 'DRD_FILE'
INTERPOLATION = 'CUBIC_SPLINE'
FILE_NAME = '>>REPLACE_DRD_FILE<<'
$-------------------------------------------------------------MANEUVER_1_SPEED
[MANEUVER_1_SPEED]
TYPE = 'DRD_FILE'
FILE_NAME = '>>REPLACE_DRD_FILE<<'
```

- **Upper Velocity Limit**
  toggle button which allows to define an upper velocity limit in press maneuver event.

- **Use vdf template driver parameters**
  toggle button with which the user choices to feed VI-Driver with the driver parameters stored in the vdf template file or with the parameters stored in the model system tree.

- **Create intermediate results file for**
  when the toggle button is checked, intermediate results file are saved in the working directory, otherwise they are deleted. It is possible to keep intermediate result files for:
  - Feasible Iterations (only)
  - All Iterations

Type
The following maneuvers are available:

- **DLC (Double Line Change) - ISO 3888-1**
- **DLC CR (Double Line Change Consumer Report)**
- **Obstacle Avoidance - ISO 3888-2**
- **Slalom (7x30.5 - 10x18 - 10x36)**
- **Custom (cones defined by the user)**

Vehicle Size
Check **Use Body Chassis Graphic** box to automatically compute vehicle size from the graphic shell, otherwise the following parameters can be used to define the vehicle size:

- Width
- Front To Origin Distance (distance of the front edge of the chassis measured with respect to the origin of the Vehicle Reference System)
- Rear To Origin Distance (distance of the rear edge of the chassis measured with respect to the origin of the Vehicle Reference System)

At the end of the simulation a VI-Driver input file is created to give the user the capability of running the final event out of iterative procedure. The event features automatic graphical representation of cones, for simulation postprocessing (live or review mode).