CREATE A ROUTE

Scope

The Tapestry system is a software suite developed by Navigation Laboratories Inc. to provide a user-friendly modeling and control gateway for the LABPRO GPS Constellation Simulator.

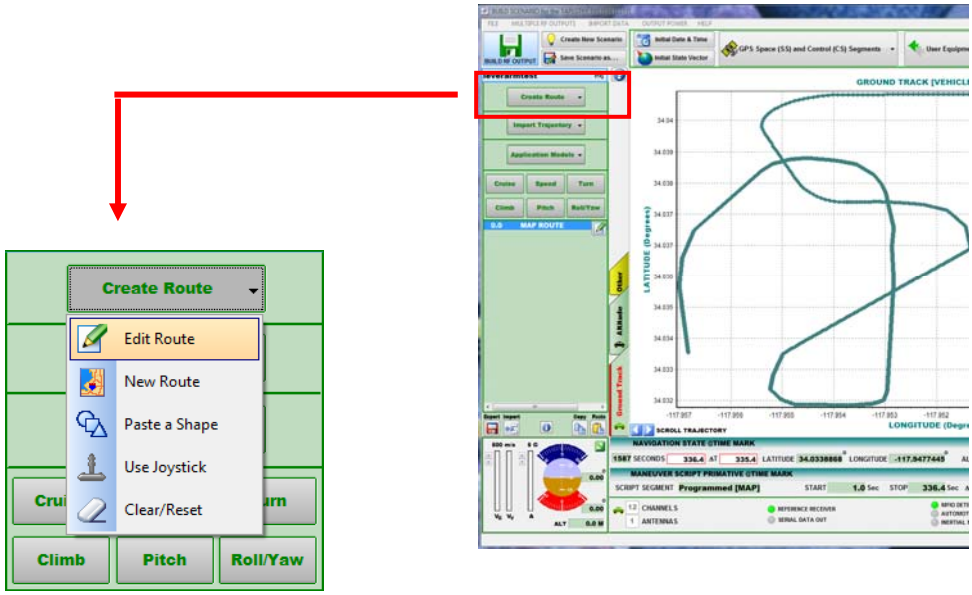
This document describes the use of the **Route Trajectory Generator [RouteMaker]**. RouteMaker is embedded within the ***Build Scenario*** Application as one of the choices available for generating a dynamic Vehicle Motion Trajectory.

In particular, RouteMaker is particularly suited for a Motion Trajectory that is best suited to a Street-map or Grid. This method is particularly well suited for the **Map-Matching** type systems.

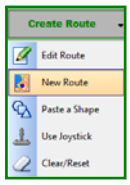
CREATING A ROUTE

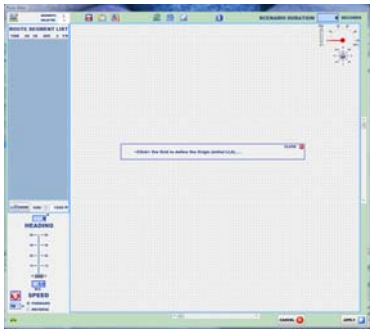
The ***Build Scenario Application*** provides a method for creating *dynamic* vehicle motion profiles utilizing a Street-map or Grid. This method is particularly well suited for the map-matching type systems.

Start the Application from the ***Build Scenario***
Main screen – select **CREATE ROUTE**



CONSTRUCTING SEGMENTS





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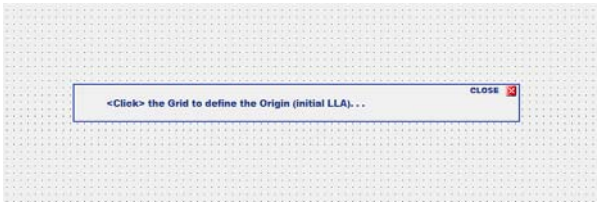

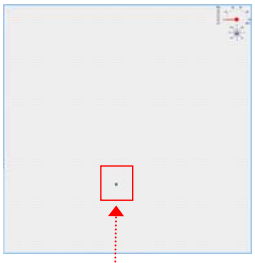

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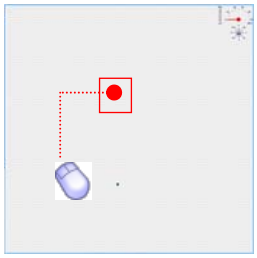

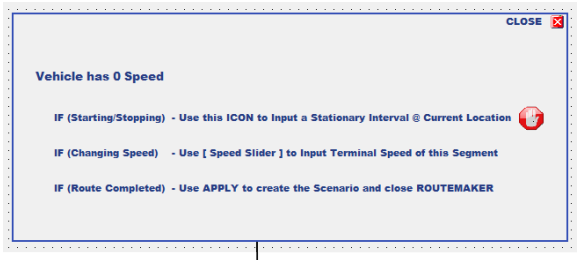

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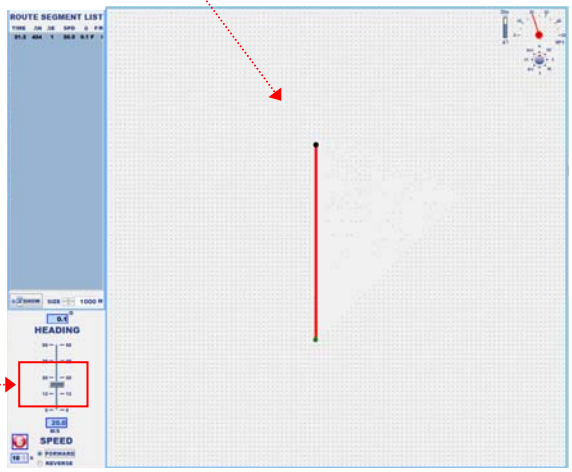

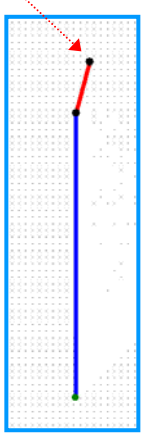

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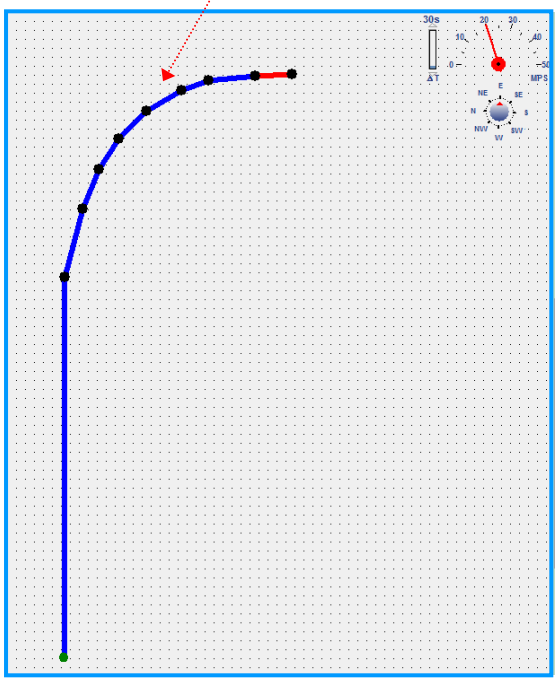

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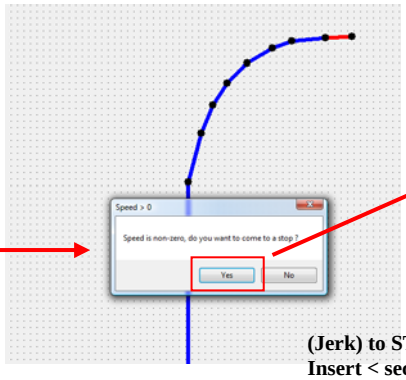
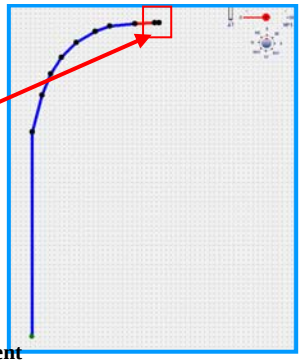
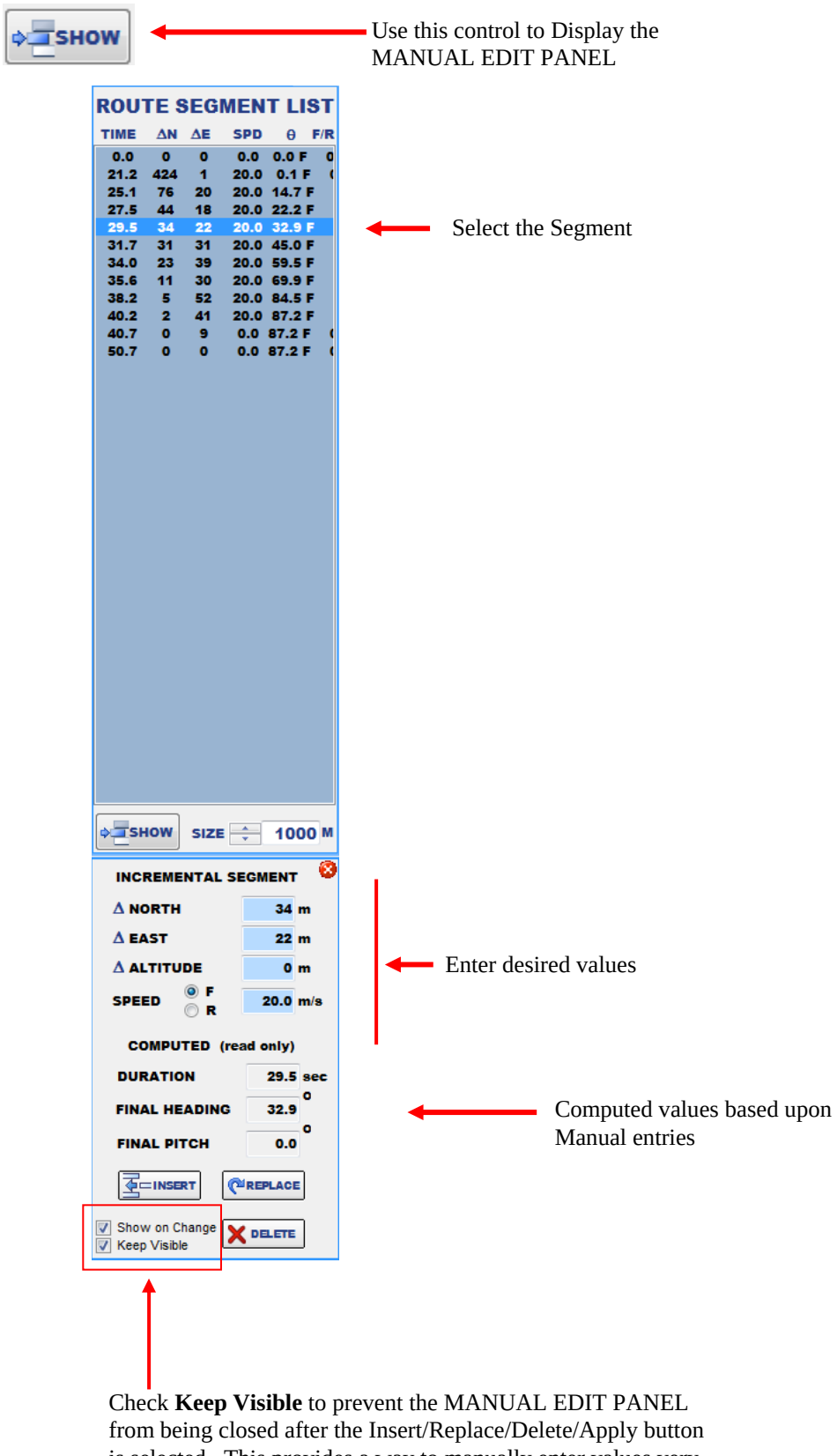




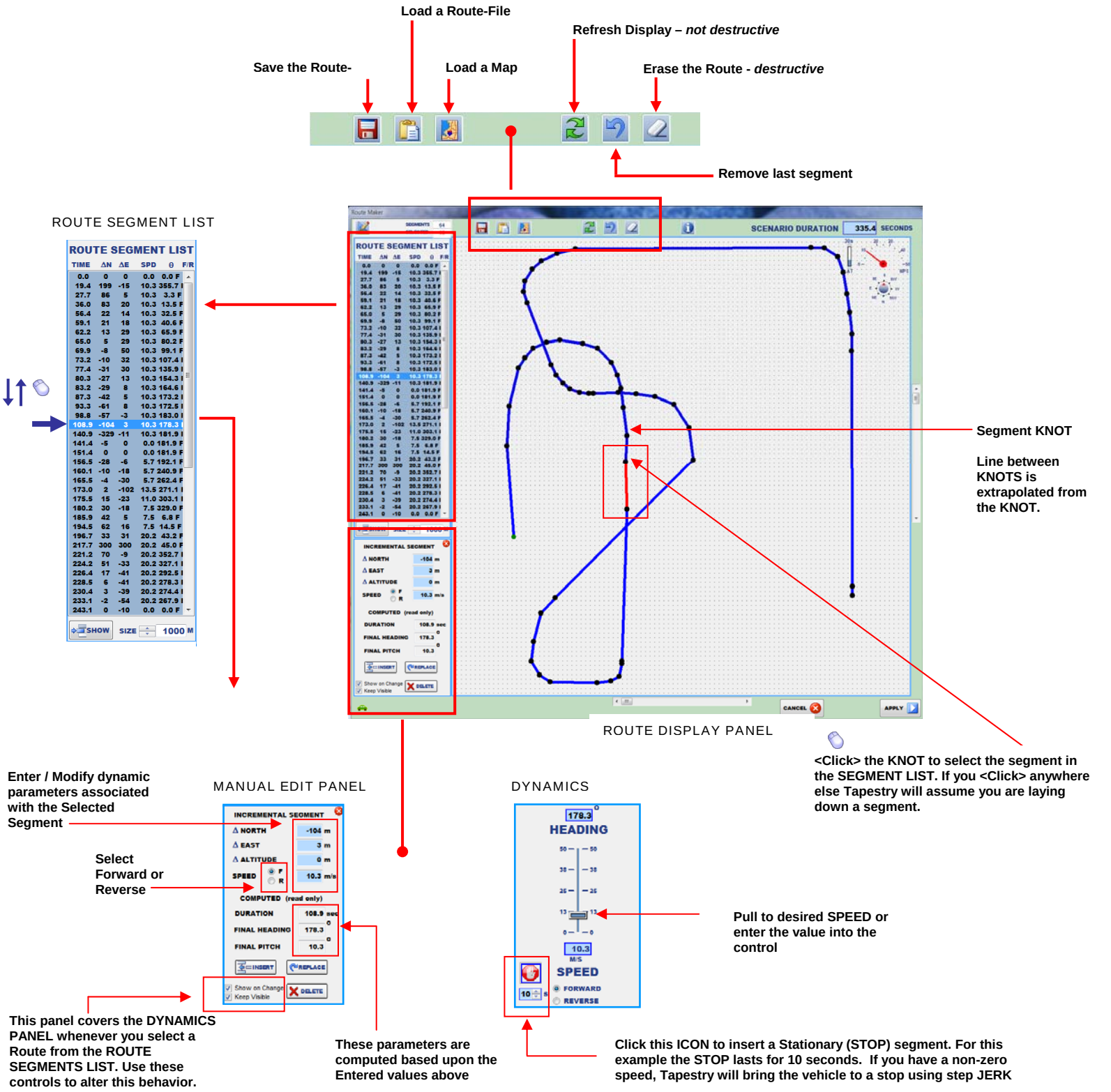
(Jerk) to STOP
Insert < sec > stationary segment

Route will be **imported** into the Scenario as a **[Week, Sec, LLA]** 10 Hz motion profile

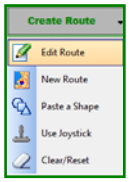
MANUAL EDIT PANEL

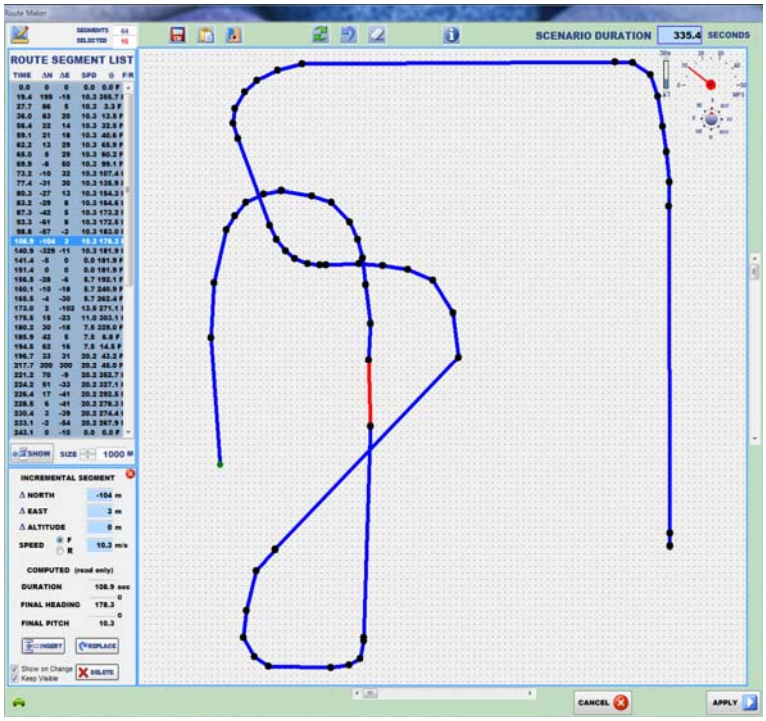


THE CONTROLS

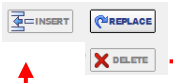


MODIFYING A ROUTE





Click or select the desired Segment. Edit the parameters in the **MANUAL EDIT PANEL** select **REPLACE** to overwrite the segment



Enter **DELETE** to remove the Segment. Tapestry will automatically reprocess all of the maneuver segments (Knots) reconnecting the segment links as required.

INSERT will add the manual segment <u>following</u> the selected segment. The downstream links will be reconnected automatically as required

Note
Occasionally a deleted/Replace/Inserted segment will create a downstream error (for example removing a change of speed). Tapestry will inform the user of the problem and restore the Segment list to its state before the Delete/Replace action.

If you want to DELETE segments, start from the bottom of the list to avoid inconsistencies.

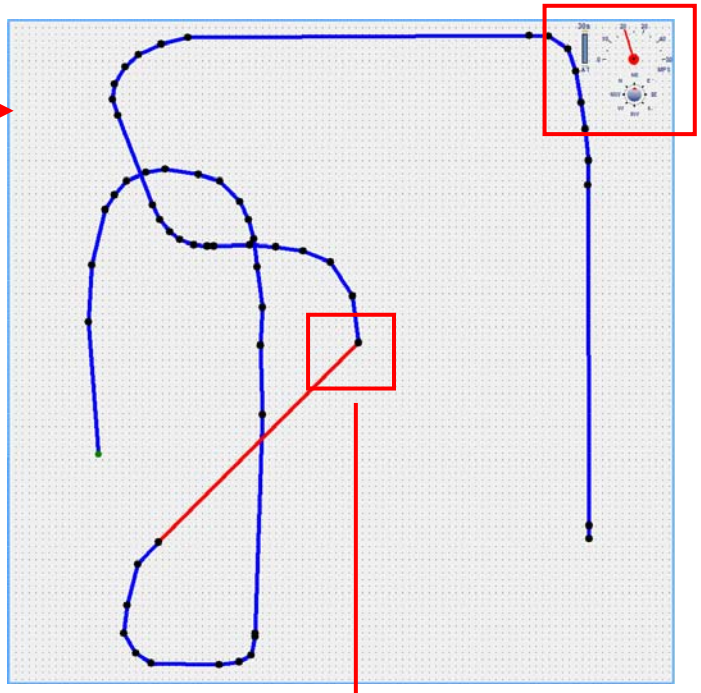
ROUTE MODELING

Use this control to Display the
MANUAL EDIT PANEL

SEGMENT ΔT

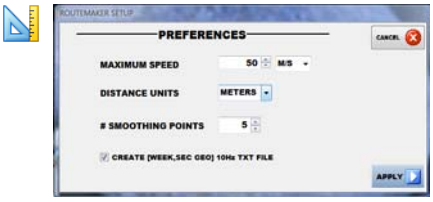
SPEED

HEADING



ROUTE SEGMENT LIST

TIME	ΔN	ΔE	SPD	θ	F/R
0.0	0	0	0.0	0.0	F
19.4	199	-15	10.3	355.7	F
27.7	86	5	10.3	3.3	F
36.0	83	20	10.3	13.5	F
56.4	22	14	10.3	32.5	F
59.1	21	18	10.3	40.6	F
62.2	13	29	10.3	65.9	F
65.0	5	29	10.3	80.2	F
69.9	-8	50	10.3	99.1	F
73.2	-10	32	10.3	107.4	F
77.4	-31	30	10.3	135.9	F
80.3	-27	13	10.3	154.3	F
83.2	-29	8	10.3	164.6	F
87.3	-42	5	10.3	173.2	F
93.3	-61	8	10.3	172.5	F
98.8	-57	-3	10.3	183.0	F
108.9	-104	3	10.3	178.3	F
140.9	-329	-11	10.3	181.9	F
141.4	-5	0	0.0	181.9	F
151.4	0	0	0.0	181.9	F
156.5	-28	-6	5.7	192.1	F
160.1	-10	-18	5.7	240.9	F
165.5	-4	-30	5.7	262.4	F
173.0	2	-102	13.5	271.1	F
175.5	15	-23	11.0	303.1	F
180.2	30	-18	7.5	329.0	F
185.9	42	5	7.5	6.8	F
194.5	62	16	7.5	14.5	F
196.7	33	31	20.2	43.2	F
217.7	300	300	20.2	45.0	F
221.2	70	-9	20.2	352.7	F
224.2	51	-33	20.2	327.1	F
226.4	17	-41	20.2	292.5	F
228.5	6	-41	20.2	278.3	F
230.4	3	-39	20.2	274.4	F
233.1	-2	-54	20.2	267.9	F
243.1	0	-10	0.0	0.0	F



HEADING

SPEED

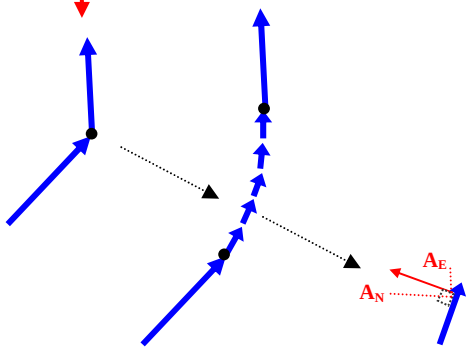
196.7	33	31	20.2	43.2 F
217.7	300	300	20.2	45.0 F
221.2	70	-9	20.2	352.7 F

TIME STEP

ΔNORTH (x)

ΔEAST (y)

FORWARD/REVERSE

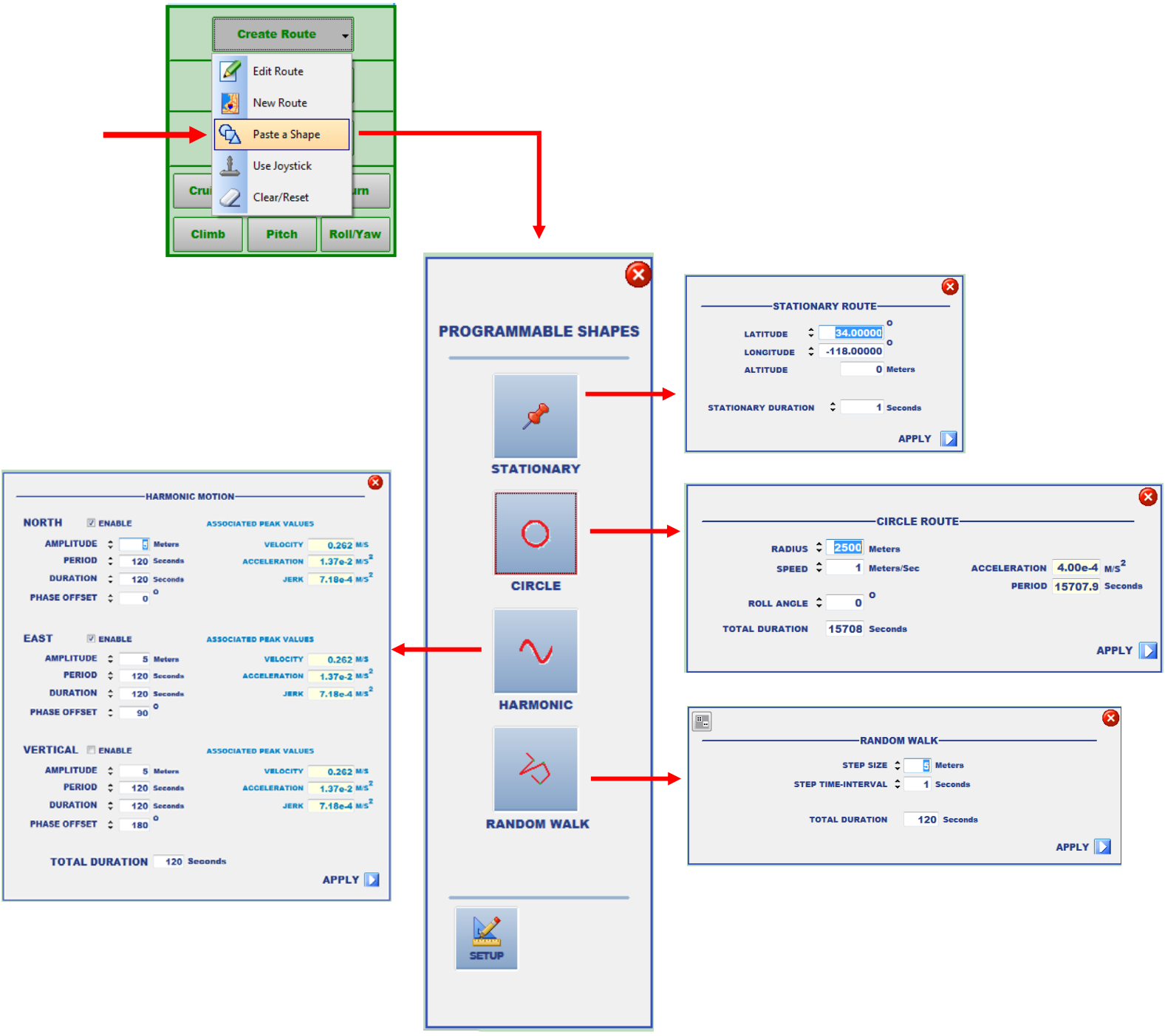


Transition from *segment-to-segment*
< N (0.1 s) > Constant Acceleration Segments

CREATING SHAPES

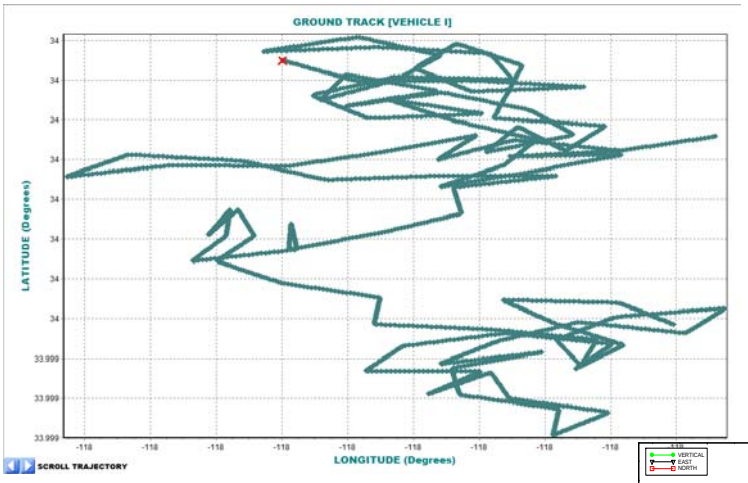
Shapes are provided in Tapestry as a method for subjecting the **Receiver Under Test** to a deterministic dynamic profile with precisely controlled Acceleration and Jerk. This is an excellent method to study navigation software under stress.

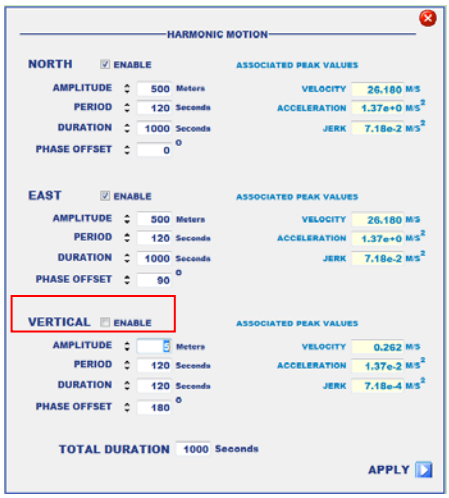
To select SHAPES, from the main Build Scenario form select **Create Route | Paste a Shape**;

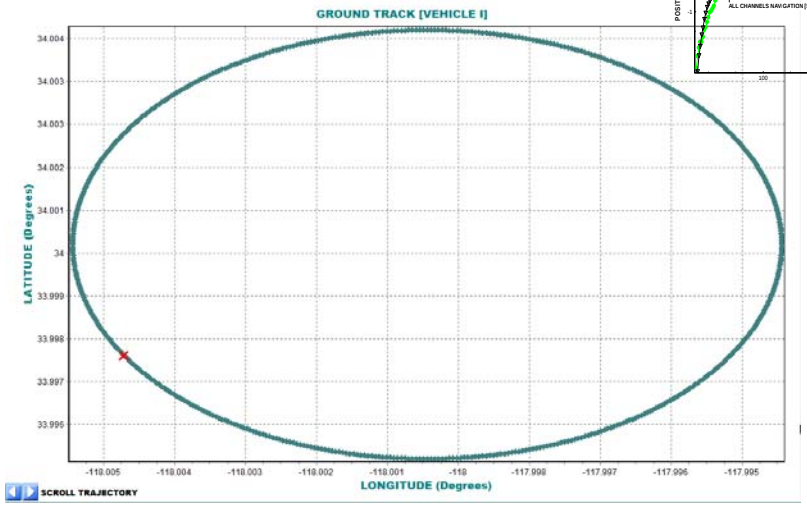


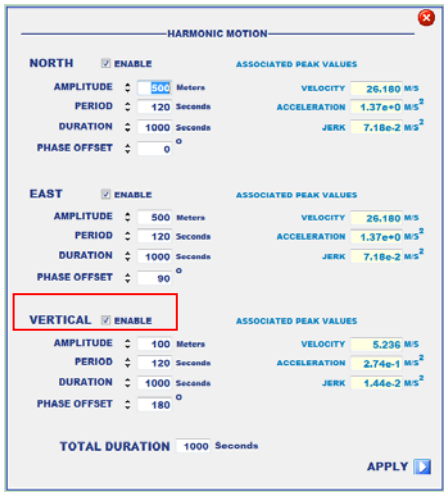
EXAMPLES

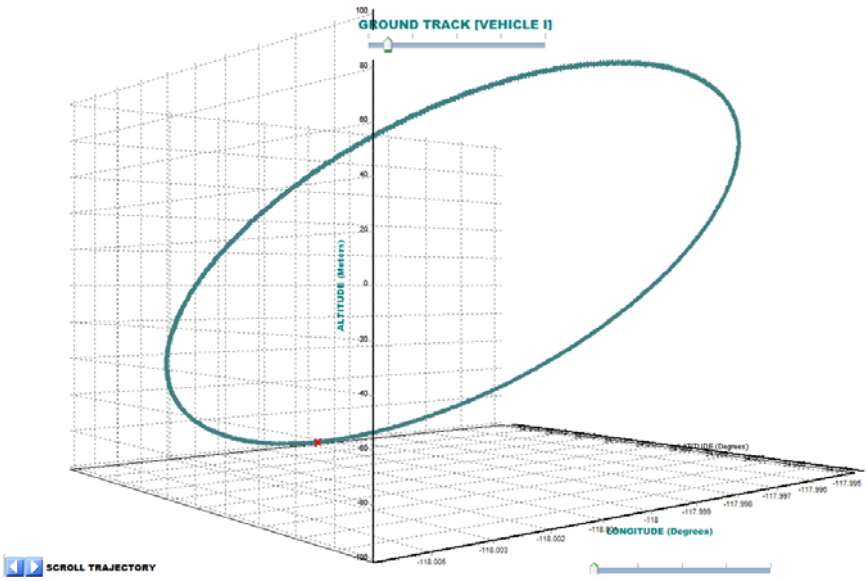
TWO AXIS MOTION



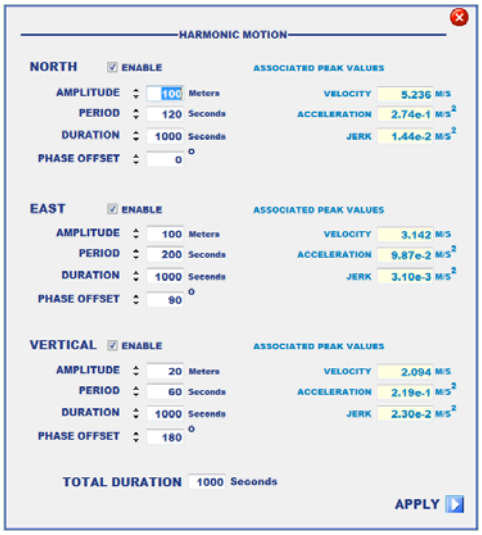




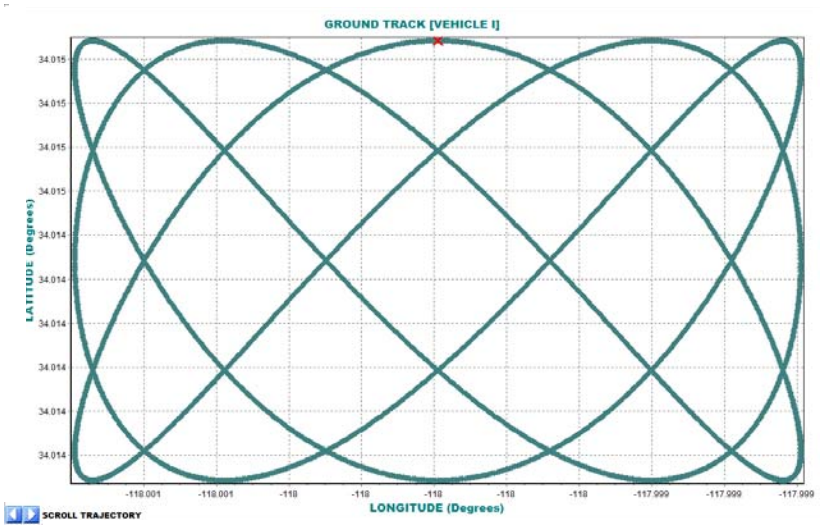




THREE AXIS MOTION

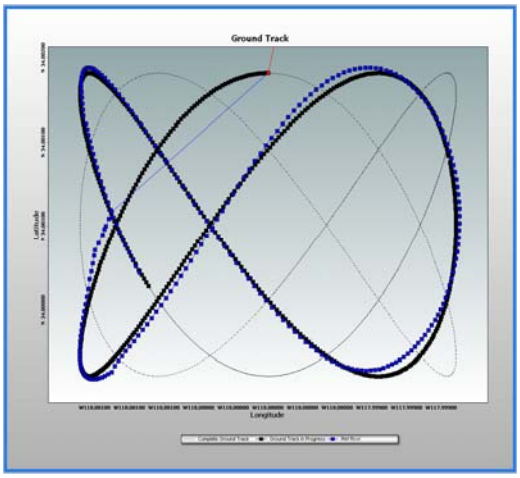


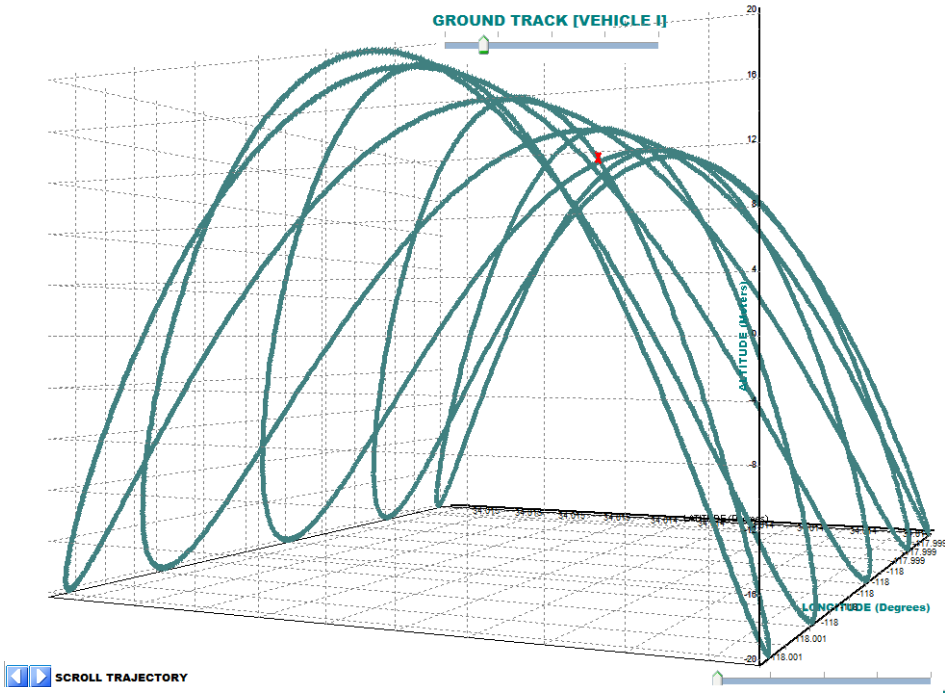
TWO DIMENSIONAL VIEW



THREE DIMENSIONAL VIEW

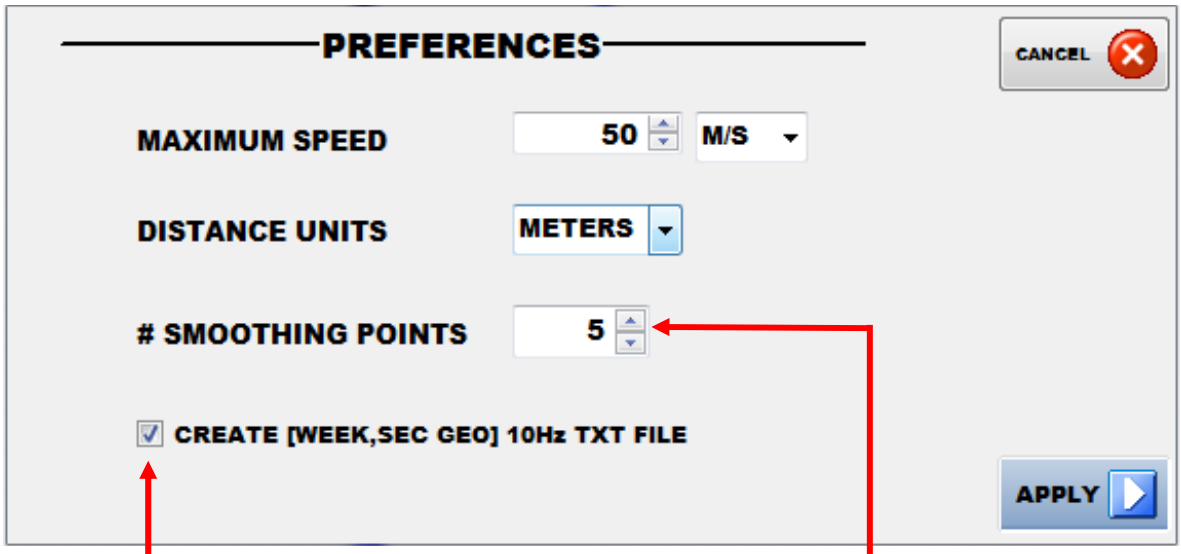
RUN-TIME with REF-RCVR OVERLAY





Shapes provide the best way to subject the Receiver Under Test into a deterministic acceleration profile. This is extremely useful if Time to First Fix (TFF) is desired under dynamics.

ROUTE MAKER SETUP



This controls the transition model from one segment to the next. The acceleration required is divided by the # and applied of the interval that lasts # x 0.1 seconds

This creates a [Week, Seconds, GEO (LLA)] 10 Hz text file IMPORTEDTRAJECTORY.TXT that is automatically imported into the Scenario when the Route Form is closed through the APPLY control.