



USING BUILD SCENARIO

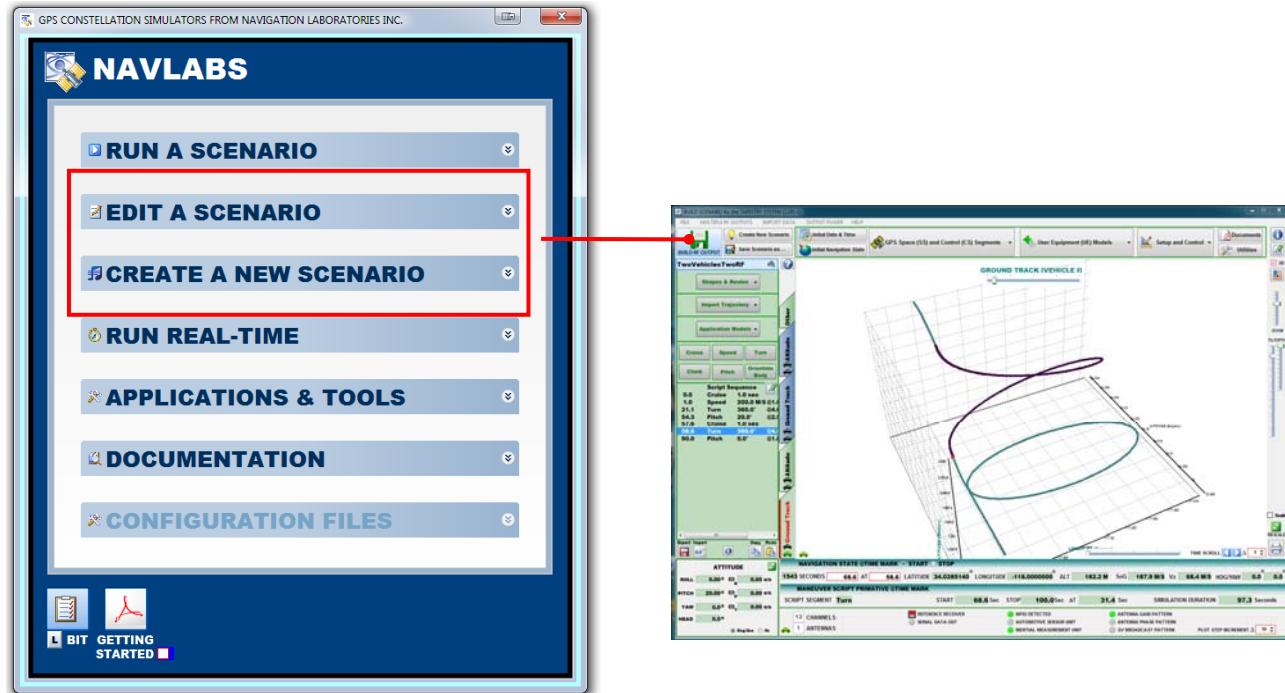
BUILD SCENARIO for the Tapestry System is the Windows Application that constructs and maintains the Scenario Data Base in its entirety.

Access **BUILD SCENARIO** from **TAPESTRY SHELL** on the computer desktop. The **BUILD SCENARIO** Main Form encapsulates all of the functions you will need to productively use the simulator.

The build number can be found in the main pull down menu **Help | About** or on the Main Form title bar.



For additional reference, this document, and other useful documents can be found in:
C:\TAPESTRY\DOCUMENTATION



A word about Color Schemes: Tapestry is a multi-RF/Multi-Vehicle system. To keep track of the current vehicle and its models, the ICON identifies Vehicle I and Vehicle II. Forms that apply to specific vehicle match the color of the ICON. A Grey form applies to both Vehicles – such as Simulation Start Time .

BUILD SCENARIO MAIN FORM

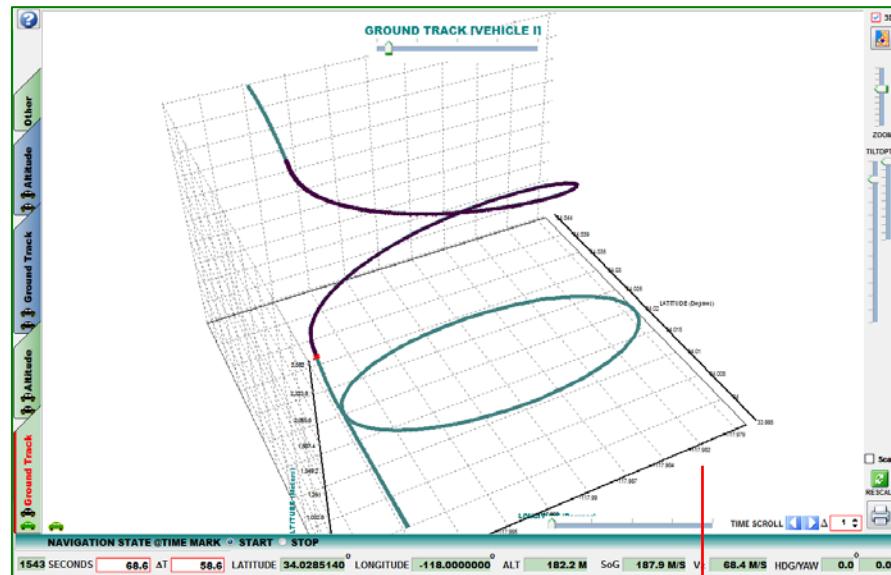
There are five group-together elements of the **BUILD SCENARIO Main Form**. The **Users Guide** is organized according to these groupings –  to hot link.



 **TOOL BAR (PG. 2)**



**VEHICLE MOTION PANEL
(PG. 9)**



PLOTTING PANEL (PG. 19)

**SATELLITE PANEL
(PG. 23)**



SUMMARY PANELS (PG. 17)



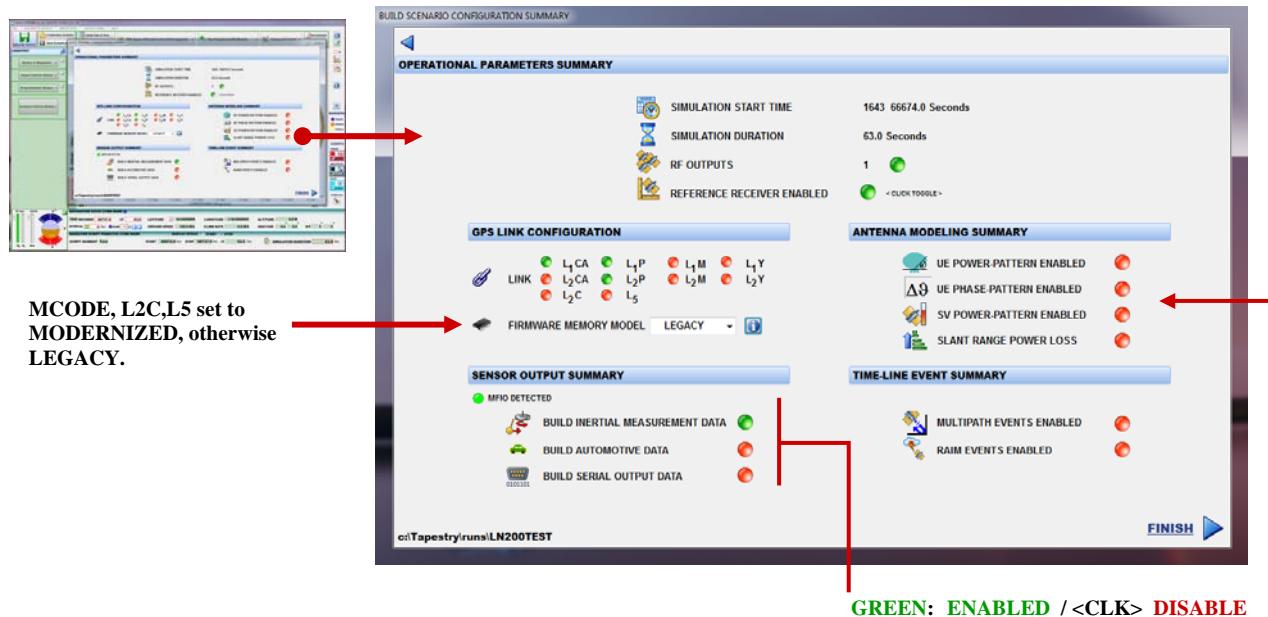


TOOL BAR / PULLDOWNS



BUILD RF OUTPUT

Scenarios must be **BUILT** before they can be **Saved**, **Edited**, or **Run**. Select this ICON to present the **BUILD SUMMARY PANEL**



From the **SUMMARY PANEL** you may verify the initial condition, the number of hardware channels, the frequency links generated, and the configuration of the attached Sensors.

When satisfied, press **NEXT**.

1. The Scenario Data Base is created in it's entirety.
2. The *just-built* data base is saved.
3. Temporary files are deleted from the Scenario Folder.
4. The Scenario is ready to be **RUN**.

To QUIT and restore the Scenario to *how-it-was*, use **FILE | Quit** or Windows **Close**.



CREATE NEW SCENARIO

Operationally, a **Scenario** is a folder within Windows located off of **c:\Tapestry\Runs**. When a new **Scenario** is created, the contents of the *Default Scenario* are copied into the folder associated with the new Scenario¹.

To create a new Scenario, use the Create-Scenario Wizard. It will handle all of the tasks associated with the creation and initialization of the simulation data base. All that is required is you enter a NAME for the Scenario.

It is recommended you create the new Scenario using TAPESTRY SHELL
[Create a New Scenario](#).



SAVE SCENARIO AS ...

Saves the *CURRENT* Scenario Data Base to another Folder with the Name as specified. The Scenario Name you specify must not already exist.

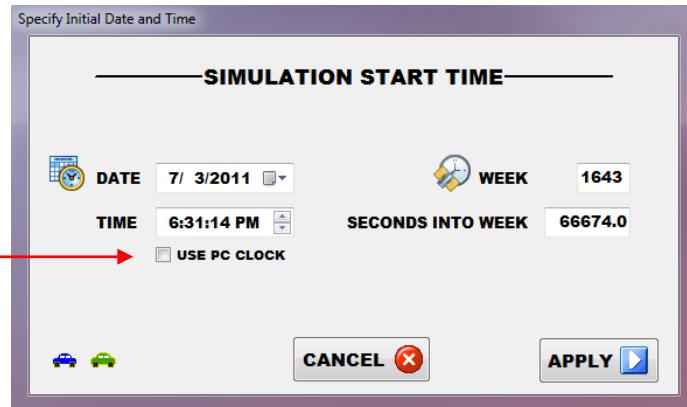
For experts, the TMP file dBase is saved as the SCN dBase in the Named Scenario. Therefore, no files have been saved in the PARENT folder - whether you do or do not save the parent, these is no effect on the child.

¹ See, “Using the TapShell Application” for other methods of initializing and customizing your new Scenario

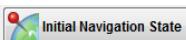


INITIAL DATE AND TIME

Enter the Initial Simulation Time in either Time-of-Date or GPS format.



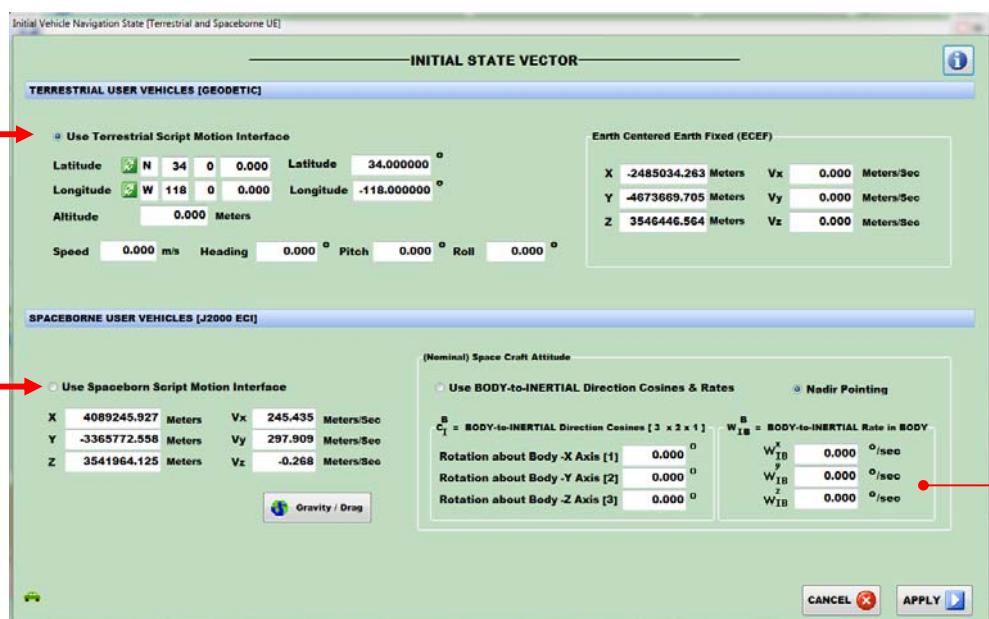
The Initial Simulation time must be at least 1 second into the week. If you are simulating a two Vehicle Scenario, both Vehicles will be constrained to start at the same simulation start time and remain synchronized in time throughout any Scenario.



INITIAL LOCATION

Enter the Initial Simulation Location. Use LLA, ECEF, ECI formats most suitable to your application.

Check for Terrestrial Motion and Projectiles

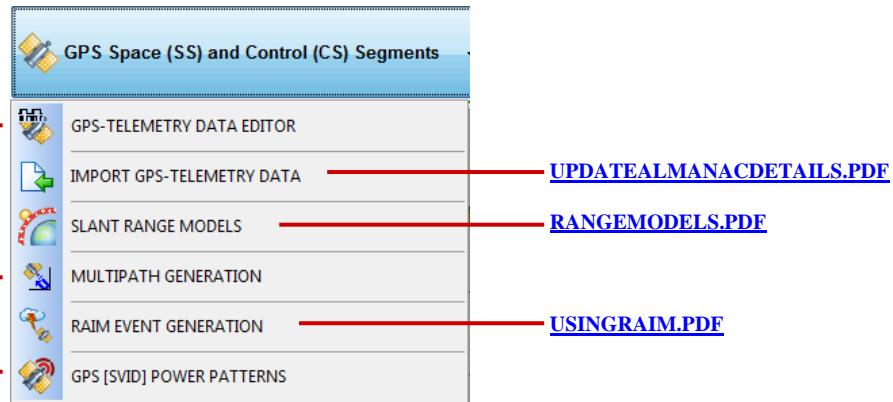


Check for Spaceborne Motion

$$C_B^I = -W_B^I \times C_B^I$$



GPS SPACE AND CONTROL SEGMENT



The Space and Control Segment is comprised of the elements of GPS responsible for determination of the Satellite Telemetry, the Propagation media, errors associated with Receiver Autonomous Integrity Monitoring (RAIM and T-RAIM), GPS SV Antenna Pattern, and Signal Composition, and Multipath.

The GPS Space and Control Segments (SS / CS) are comprehensively modeled by the TAPESTRY System. This document presents the details of the modeling encapsulated in the REVIEW / MODIFY TELEMETRY Form.

<C:\TAPESTRY\DOCUMENTATION\MANUALS\USINGSATDBASEEDITOR.PDF>

The document provides details of Antenna Modeling and Lever Arms;

<C:\TAPESTRY\DOCUMENTATION\MANUALS\ANTENNAMODELING.PDF>

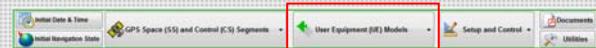
The document provides details of the Ionosphere and Troposphere modeling and other line-of-sight models.

<C:\TAPESTRY\DOCUMENTATION\MANUALS\RANGEMODELS.PDF>

MULTIPATH and RAIM details can be found here

<C:\TAPESTRY\DOCUMENTATION\MANUALS\USINGRAIM.PDF>
<C:\TAPESTRY\DOCUMENTATION\MANUALS\HWMULTIPATH.PDF>

TOOL BAR / PULLDOWNS



USER SEGMENT (HOST VEHICLE SENSORS)

[AUXSENSORSHELL.PDF](#)

[USINGTHEIMUMODEL.PDF](#)

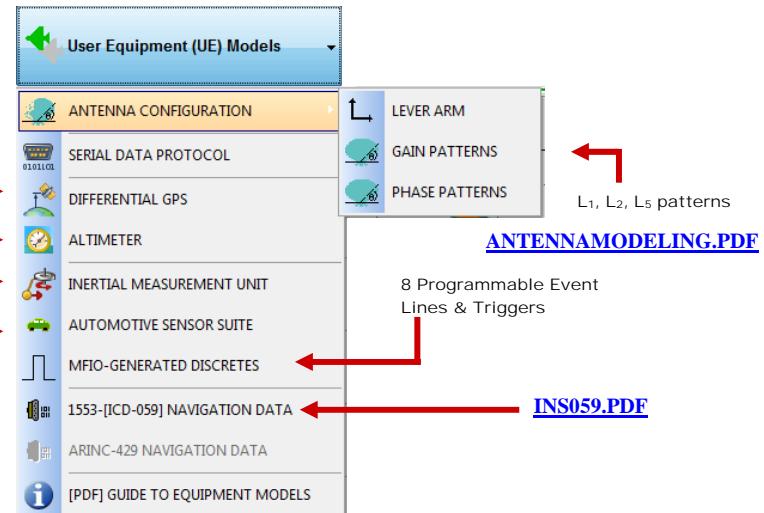
Navigation and Autopilot for
SDLC: HG1700, LN200
AMRAAM: RS422D types

RTCM-104 Type 1,2 & 9 via RS232 →

[BAROMODEL.PDF](#) →

- 4 Discrete Wheel Wheel-Speed Outputs (LF RF / LR RR)
- Odometer Output
- Gyro Triad 0-5 VDC / 50 Ω /Error models
- Accelerometer Triad 0-5 VDC / 50 Ω /Error models

[USINGAUTOMOTIVEMODEL.PDF](#)



TAPESTRY was designed from the outset to combine the GPS line-of-sight data with Auxiliary Sensors that enhance system performance when GPS availability/quality is degraded. The Tapestry System was designed with these types of distributed systems in mind.

As a component of a distributed simulation environment, The Tapestry System provides:

- High Speed Closed Loop Operation for minimal transport delay and maximum update rate.
- ± 10 nanosecond pulse output synchronized with our 1 second GPS rollover.
- Slave operation where we respond to an incoming pulse.
- 10 MHz input/output phase locked to our internal 10.23 MHz OCX.

Additionally, **TAPESTRY** can emulate the outputs of additional auxiliary sensors. Using our proprietary PCI expansion card [**Multi Function Input Output MFIO**] we can produce data and electrical outputs that mimic those from SDLC/RS422D Inertial Measurement Units (IMU). Analog and digital/serial outputs that support automotive sensors such as the SiRFSTAR-I/II.

TOOL BAR / PULLDOWNS



SETUP AND PREFERENCES

Program Preferences

Vehicle Motion Source

- Use Terrestrial Script Motion Interface
- Use Spaceborn Script Motion Interface
- Vehicle Motion via Imported Trajectory

Display Units

- Meters
- Feet
- Miles
- Km
- NM

- m/s
- ft/s
- Km/s
- MPH
- KPH

- m/s²
- ft/s²
- G

Linear Dynamics Constraints

Maximum Speed	1000.0	m/s
Maximum Acceleration	100.0	m/s ²
Maximum Jerk	1000.0	m/s ³

Rotational Dynamics Constraints

Max Angular Rate	3.1	°/sec
Max Angular Acceleration	3.1	°/sec ²
Max Angular Jerk	3.1	°/sec ³

Spaceborne Model

Good Coefficient A_1	0.0010826
Good Coefficient A_2	-0.0000026
Good Coefficient A_3	-0.0000016
Drag Coefficient	-0.0000016

Miscellaneous

- Show 4-Digit Bars
- Show Attitude Gauge on Main Display
- Dump Data in Spread Sheet Format

Scroll Increment (secs): Plot Resolution (secs): + faster resolution

CANCEL **APPLY**



SETUP AND PREFERENCES

PREFERENCES AND CONSTRAINTS

SERIAL DATA SETUP

FLEX POWER AND RF LEVELS

COMPOSITE SIGNAL STRUCTURE

1-PULSE-PER-SECOND SETUP

USING SERIAL DATA.PDF

1-PPS Parameters

— ONE PULSE PER SECOND SETUP / 10PPS MIRROR —

Output Synchronization

- Scenario Startup [START PULSE configuration]
- Hardware PowerUp [STEL configuration]

Polarity

- + [RISING]
- [FALLING]

Pulse Width

100 milliseconds

Delay

64 0-256

50 Ohm Impedance SMA

CANCEL **APPLY**

[HARDWARE CONFIGURATION.PDF](#)

FREQUENCY-LINK COMPOSITION

— FREQUENCY-LINK COMPOSITION —

SATELLITE ID: **CHECK TO USE CHANNEL**:

FIRMWARE MEMORY MODEL: LEGACY

L1 Legacy Signals

ENABLE	CA	P	DATA
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

L1M Signals

ENABLE	MNAV	SDS	PA	SPOT	MUX SCHEME	NAVDATA RATE
<input type="checkbox"/>	Equ. 6.3	200 SPS				

L2 Legacy Signals

ENABLE	CA	P	DATA
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

L2M Signals

ENABLE	MNAV	SDS	PA	SPOT	MUX SCHEME	NAVDATA RATE
<input type="checkbox"/>	Equ. 6.3	200 SPS				

L2C Signals

ENABLE	DATA
<input type="checkbox"/>	<input type="checkbox"/>

L5 Signals

ENABLE	C	DATA
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SA / AS

ENABLE	
<input type="checkbox"/>	<input type="checkbox"/>

COMPOSITE SIGNAL FILE

CANCEL **APPLY**

RF-OUTPUT POWER LEVELS

— DIGITAL ATTENUATION & FLEX POWER —

RF Power Display Format

- ABSOLUTE dBm
- RELATIVE ATTEN.

Global Attenuation Settings

APPLICABLE RF: 1 **Apply to All RF Outputs**

REFRCVR ATTN: 32.0 dB

EXTERNAL ATTENUATION: 31.0 dB must use Run Scenario to modify

RF ATTENUATION: 10.0 dB

DIGITAL ATTENUATION: L₁ 5.0 dB L₂ 5.0 dB L₅ 5.0 dB

COMPOSITE POWER: L₁ -116.0 dBm L₂ -116.0 dBm L₅ -116.0 dBm

Inter-Link FlexPower

L ₁ CA	0.0 <input type="text"/> dB	-116.0 <input type="text"/> dBm	L ₂ C	0.0 <input type="text"/> dB	-116.0 <input type="text"/> dBm
L ₁ P	0.0 <input type="text"/> dB	-116.0 <input type="text"/> dBm	L ₂ P	0.0 <input type="text"/> dB	-116.0 <input type="text"/> dBm
L ₁ M	0.0 <input type="text"/> dB	-116.0 <input type="text"/> dBm	L ₂ M	0.0 <input type="text"/> dB	-116.0 <input type="text"/> dBm

LEGACY

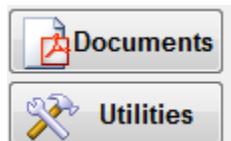
RF LEVELS ICD-GPS-200 **RF LEVELS ICD-GPS-700**

CANCEL **APPLY**

TOOL BAR / PULLDOWNS



MANUALS AND DATA ACCESS UTILITIES



Browse the Documents Folder

Name	Size	Item type	Date modified
SPPS.pdf	60.0 KB	Adobe Acrobat...	7/27/2009 8:15...
AnalogIOPInOut.pdf	41.2 KB	Adobe Acrobat...	6/10/2009 4:04...
AntennaLookUpAngle...	25.4 KB	Adobe Acrobat...	10/17/2008 4:5...
AntennaModeling.pdf	655 KB	Adobe Acrobat...	12/31/2010 4:1...
AutomotiveVehicle.pdf	49.9 KB	Adobe Acrobat...	4/17/2008 9:24...
AutomotiveVehicle.pdf	20.2 KB	Adobe Acrobat...	1/13/2003 4:49...
AuxSensorShelf.pdf	29.9 KB	Adobe Acrobat...	1/12/2011 2:58 PM
BadHandover.pdf	18.0 KB	Adobe Acrobat...	8/20/2009 5:17...
BandModel.pdf	46.9 KB	Adobe Acrobat...	9/25/2009 5:24...
BandModel.pdf	44.5 KB	Adobe Acrobat...	9/25/2009 5:24...
Beitz_CoderTraining.pdf	267 KB	Adobe Acrobat...	1/11/2003 4:09...
BullScenarioShortQu...	122 KB	Adobe Acrobat...	7/29/2009 5:17...
BullSummary.pdf	110 KB	Adobe Acrobat...	10/25/2009 9:2...
Calibration.pdf	236 KB	Adobe Acrobat...	1/21/2005 2:4...
ClosedLoopController...	2.13 KB	Adobe Acrobat...	12/31/2008 11:...
ClosedLoopController...	873 KB	Adobe Acrobat...	1/13/2003 5:02...
CreatingAnotherAnt...	61.1 KB	Adobe Acrobat...	7/25/2010 11:3...
CreatingAnotherVeh...	113 KB	Adobe Acrobat...	7/25/2010 7:1...
DataFileFormat.pdf	34.4 KB	Adobe Acrobat...	10/12/2009 10:5...
DataFileFormat.pdf	30.1 KB	Adobe Acrobat...	3/7/2008 4:53 PM
DataEditor.pdf	495 KB	Adobe Acrobat...	1/19/2009 12:...
DataEditInOptions...	24.7 KB	Adobe Acrobat...	6/8/2009 3:09 PM
DB2MTDPout.pdf	49.0 KB	Adobe Acrobat...	4/2/2007 12:03...
DetailsOftheIMU.pdf	357 KB	Adobe Acrobat...	12/30/2009 6:1...
DifferenceRangeFiles...	188 KB	Adobe Acrobat...	7/22/2008 3:06...
DumpRange.pdf	86.7 KB	Adobe Acrobat...	12/30/2009 5:3...
DumpScript.pdf	153 KB	Adobe Acrobat...	8/19/2010 8:02...
DumpTrajectory.pdf	76.6 KB	Adobe Acrobat...	9/23/2010 8:17...
DumpTruthData.pdf	260 KB	Adobe Acrobat...	10/12/2009 9:30...
DumpTruePower.pdf	233 KB	Adobe Acrobat...	2/2/2010 6:38 PM
ProPower.pdf	49.0 KB	Adobe Acrobat...	2/3/2010 11:37...
FrequentlyAskedQue...	171 KB	Adobe Acrobat...	4/16/2007 7:35...
GettingStarted.pdf	847 KB	Adobe Acrobat...	8/17/2010 8:57...
HardwareConfigurat...	108 KB	Adobe Acrobat...	1/1/2011 8:13 PM
HWMPath.pdf	230 KB	Adobe Acrobat...	1/1/2011 8:37 PM
Import1240.pdf	62.0 KB	Adobe Acrobat...	12/11/2009 8:1...
ImportAck.pdf	54.9 KB	Adobe Acrobat...	7/31/2008 9:41...
ImportBinary.pdf	55.4 KB	Adobe Acrobat...	12/12/2009 7:1...

[IMPORT SHELL.PDF](#)

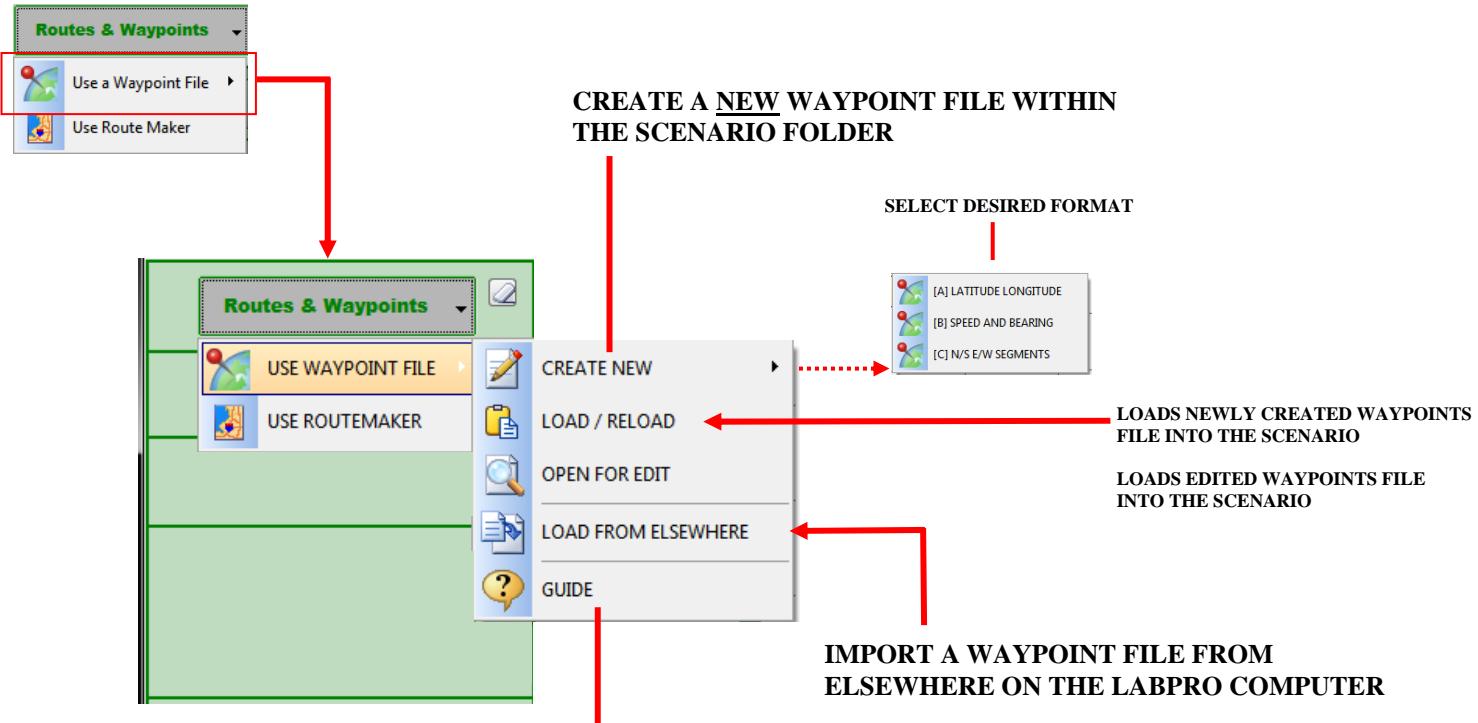
[DUMP TRUTH DATA.PDF](#)

[DUMP RANGE.PDF](#)

[DUMP TRAJECTORY.PDF](#)

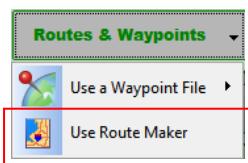
The screenshot shows the Tapestry Tools application window. On the left, the "IMPORT TRUTH DATA" panel contains several file selection buttons for Motion Files (Week Sec Geodetic, ECEF, SCS2450 ECEF, 50Hz Sec ECEF), NavData Recorder File (BIN), TAPESTRY TRAJECTORY (BIN), and VOYAGER TRAJECTORY (BIN). It also includes checkboxes for "Initial State Equal to First Processed Record", "Sync NAVDATA consistent with Start Time", "Skip the FIRST line in the import File", and "Construct Attitude from Dynamics". On the right, the "EXTRACT TRUTH DATA" panel contains buttons for Dump Range Truth, Dump Vehicle Motion Truth, Dump Legacy Data, Dump MNAV DATA, Dump MNAV Messages, Dump L2C / L5 DATA, Dump L2C L5 Msgs, Dump SvStatus File, Dump IMU Sensor Data, Dump Automotive Data, Open SATPOWERPRO, and Dump Data Structs. A "Specialized Debug Tools" section at the bottom right contains a button for Difference Range Files.

ROUTES & WAYPOINTS



WAYPOINT FORMAT DESCRIPTION

OPENS WAYPOINTS.TXT.
IF CHANGED FILE MUST
BE (RE) LOADED

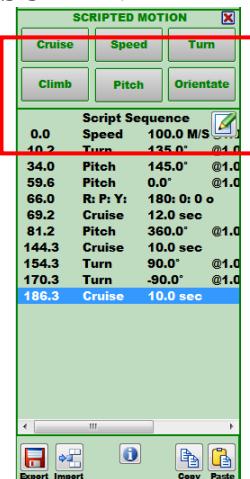


see this document for details: [USING ROUTE MAKER.PDF](#)

VEHICLE MOTION PANEL

SCRIPTED VEHICLE MOTION

Tapestry provides a highly accurate 6-DOF Vehicle-Motion Generator. Construct a Motion Trajectory for your tests by chaining together maneuver primitives. The maneuver-primitive-chain is collectively referred to as the **SCRIPT**.



MANEUVER PRIMITIVES



Programmable Shapes ▾

PROGRAMMABLE SHAPES

BALLISTIC PROJECTILE JERK PROFILE 3 AXIS SPIN

Application Models ▾

MAINTAIN STATE

PROGRAMMED

- DURATION

CRUISE

300 S

1 H 2 H 3 H 4 H 5 H Larger

Cruise Duration 1 Seconds

SUPERIMPOSED ANGULAR RATES

Apriori 0.00 °/s W_{NOSE} 0.0 0 sec W_{PITCH} 0.0 0 sec W_{HEADING} 0.0 0 sec

CHANGE SPEED

Terminal Speed 500 1000 m/sec

Terminal Acceleration 10.0 m/s² Applied Jerk 1000.0 m/s³

SUPERIMPOSED ANGULAR RATES

Apriori 0.00 °/s W_{NOSE} 0.0 0 sec W_{PITCH} 0.0 0 sec W_{HEADING} 0.0 0 sec

CHANGE SPEED

PROGRAMMED

- TERMINAL SPEED
- ACCELERATION / JERK

CHANGE SPEED

Terminal Speed 500 1000 m/sec

Terminal Acceleration 10.0 m/s² Applied Jerk 1000.0 m/s³

SUPERIMPOSED ANGULAR RATES

Apriori 0.00 °/s W_{NOSE} 0.0 0 sec W_{PITCH} 0.0 0 sec W_{HEADING} 0.0 0 sec

CHANGE HEADING

PROGRAMMED

- TERMINAL HEADING
- BANK ANGLE AND RATE
- ACCELERATION / JERK

CHANGE HEADING

-360° 0° 360°

Change in Heading 0°

Terminal Angular Rate 10 °/sec

SUPERIMPOSED ANGULAR RATES

Apriori 0.00 °/s W_{NOSE} 0.0 0 sec W_{PITCH} 0.0 0 sec W_{HEADING} 0.0 0 sec

CHANGE ALTITUDE

PROGRAMMED

- TERMINAL ALTITUDE
- PITCH ANGLE
- RADIAL ACCELERATION / JERK

CHANGE ALTITUDE

60000 Meters

-90° 0° 90°

Terminal Altitude 0° Meters

Terminal Pitch Angle 30.0 Degrees

Terminal Acceleration 10.0 m/s² Applied Jerk 100.0 m/s³

SUPERIMPOSED ANGULAR RATES

Apriori 0.00 °/s W_{NOSE} 0.0 0 sec W_{PITCH} 0.0 0 sec W_{HEADING} 0.0 0 sec

CHANGE PITCH

PROGRAMMED

- PITCH ANGLE AND RATE
- ACCELERATION / JERK

CHANGE PITCH

-360° 0° 360°

Final Pitch Angle 0.0

Radial Acceleration 10.0 m/s² Radial Jerk 100.0 m/s³

SUPERIMPOSED ANGULAR RATES

Apriori 0.00 °/s W_{NOSE} 0.0 0 sec W_{PITCH} 0.0 0 sec W_{HEADING} 0.0 0 sec

CHANGE BODY ORIENTATION

PROGRAMMED

- ATTITUDE
- BODY RATES
- ACCELERATION / JERK

CHANGE BODY ORIENTATION

0.0 0.0 0.0

BANK ANGLE Δ 0.0 0.0 0.0

ANGLE OF ATTACK Δ 0.0 0.0 0.0

SIDE SLIP Δ 0.0 0.0 0.0

APPLY ANGULAR RATES [EULER]

Δ W_{NOSE} 0.0 0 sec Δ W_{PITCH} 0.0 0 sec Δ W_{DOWN} 0.0 0 sec



SCRIPTED VEHICLE MOTION

MODIFY SEGMENT

Select desired maneuver primitive

Index	Maneuver Type	Value	Condition
0.0	Cruise	2.0 sec	
2.0	Speed	200.0 M/S @1.0	
22.1	Turn	360.0° @1.0	
147.9	Turn	-360.0° @3.0	
190.1	Climb	12000.0 M	
317.2	Turn	-180.0° @1.0	
380.2	Turn	-90.0° @1.0	
411.8	Cruise	6.0 sec	
417.8	Turn	90.0° @1.0	
449.4	Cruise	8.0 sec	
457.4	Turn	360.0° @4.0	
489.3	Turn	-360.0° @5.0	
515.0	Cruise	8.0 sec	
523.0	Climb	1232.0 M @1.0	

Export Import Copy Paste

— MODIFY THE SELECTED MANEUVER PRIMITIVE —

SELECTED MANEUVER PRIMITIVE TURN Coordinated

START TIME	318.2 Seconds into Week	317.2 Seconds into Simulation
STOP TIME	381.2 Seconds into Week	380.2 Seconds into Simulation
DURATION	63.0 Seconds	
INITIAL SPEED	200.0 M/S	
INITIAL ALTITUDE	12006.45 Meters	
HEADING CHANGE	-180.000 Deg	
RADIAL ACCELERATION	-9.989 M/S ²	
RADIAL JERK	-99.892 M/S ³	
Terminal Roll Rate	0 °/S	
Terminal Pitch Rate	0 °/S	
Terminal Yaw Rate	0 °/S	



Delete the highlighted segment

Delete ALL segments AFTER selected segment

Delete ALL the segments



Use the Preferences button to specify the maximum acceleration, jerk, and dynamic conditions associated with your simulated vehicle.





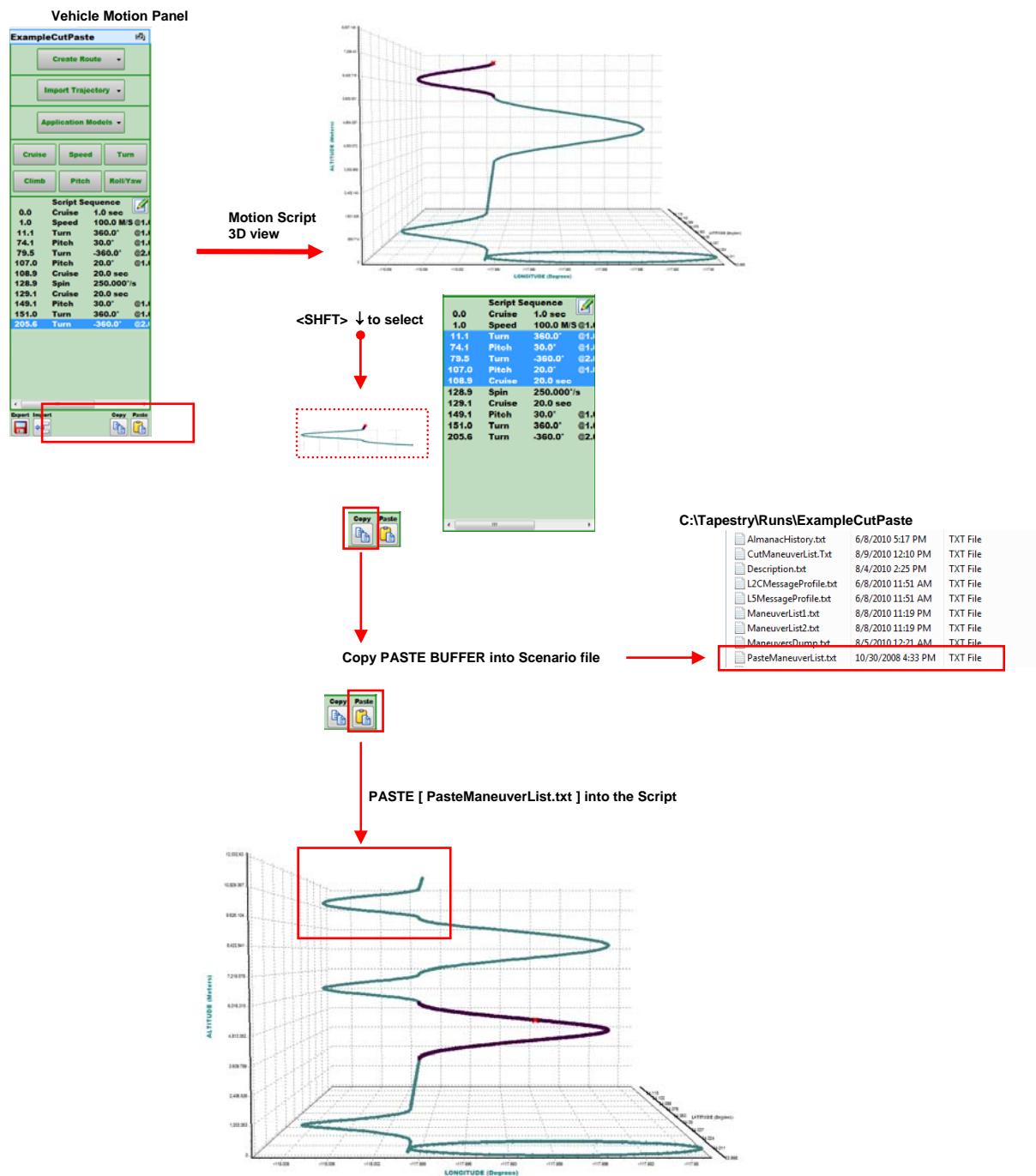
SCRIPTED VEHICLE MOTION

SCRIPT EDITOR CONTROLS



The Vehicle Motion Panel includes controls and keystroke-macros for use in the construction of the Vehicle Motion *Script*.

< CTRL C > COPY
 < CTRL X > CUT
 < CTRL V > PASTE

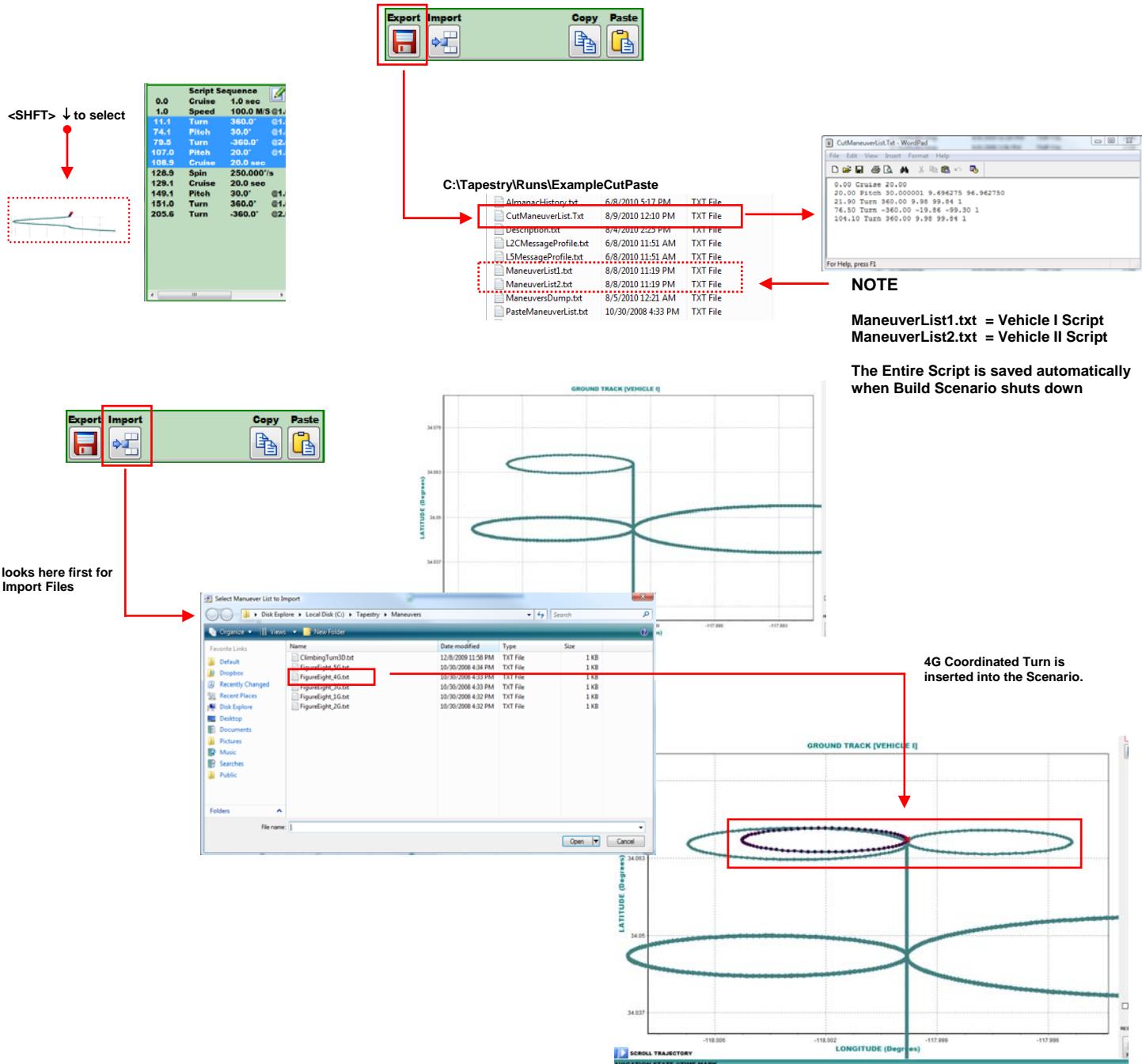




SCRIPTED VEHICLE MOTION

Use **EXPORT** to select a group of maneuver segments and outputs them into a file than can be IMPORTED into *this* or other Scenario's. By construction, when **BUILD SCENARIO** updates the dBase, the **Motion Script** for both Vehicle I and II are saved within the Scenario Folder: [CUTMANEUVERLIST.TXT].

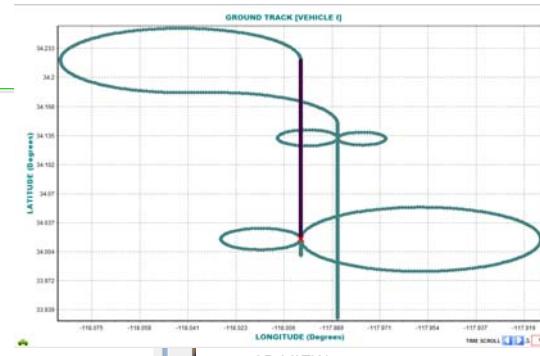
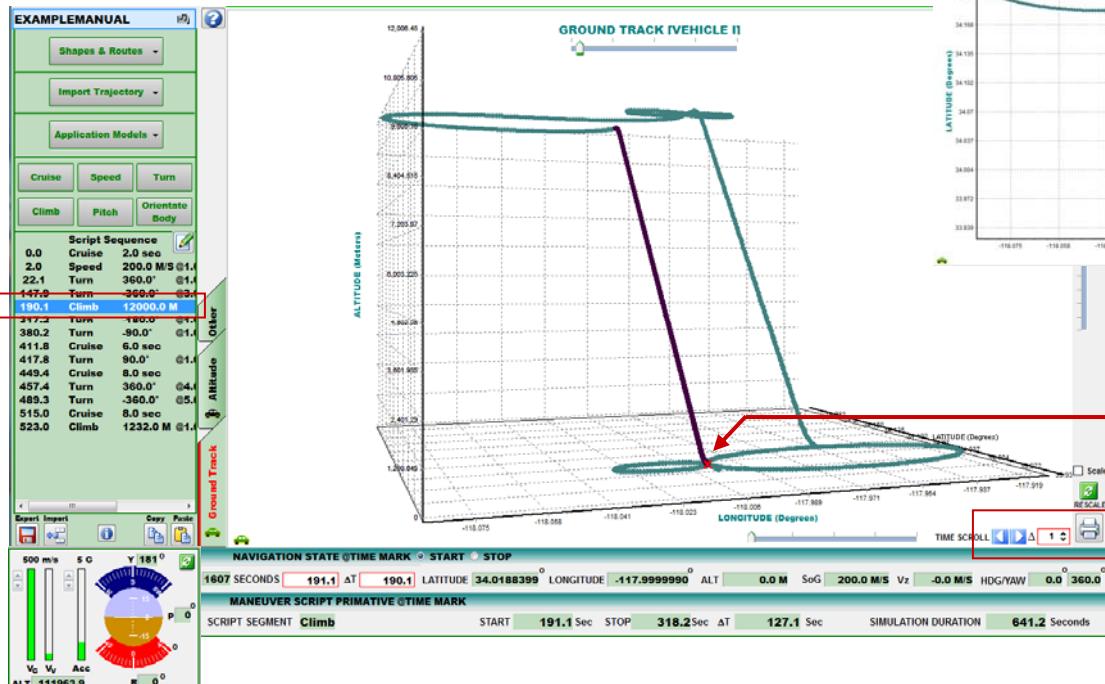
If you want to use this file later, copy it elsewhere so it won't be overwritten. For your convenience, we have created a folder **C:\TAPESTRY\MANEUVERS** for this purpose. When you use the **IMPORT** command, Tapestry will look in this folder first for a segments file.





SCRIPTED VEHICLE MOTION

MANEUVER SCRIPT POINT & CLICK / BROWSING / SETTING THE CURRENT TIME



Click on the maneuvers in the script and the entire Main Form will synchronize depending upon the SHOW MANEUVER settings.

BROWSE through the maneuver one-step-at-a-time using the SCROLL control. The selected point on the GROUND TRACK DISPLAY will be marked with a RED CROSS: X



SPACEBORNE MANEUVERS

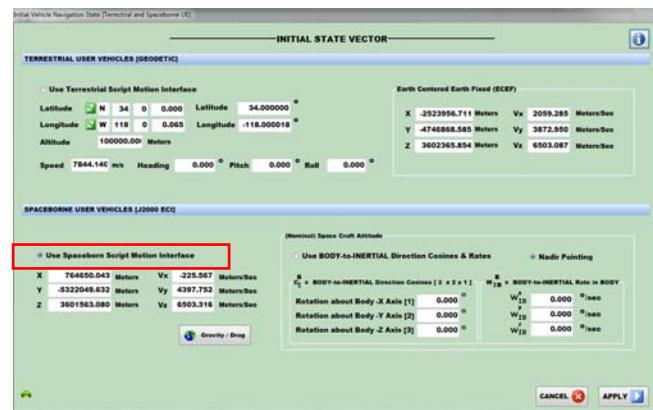


ORBITAL MOTION

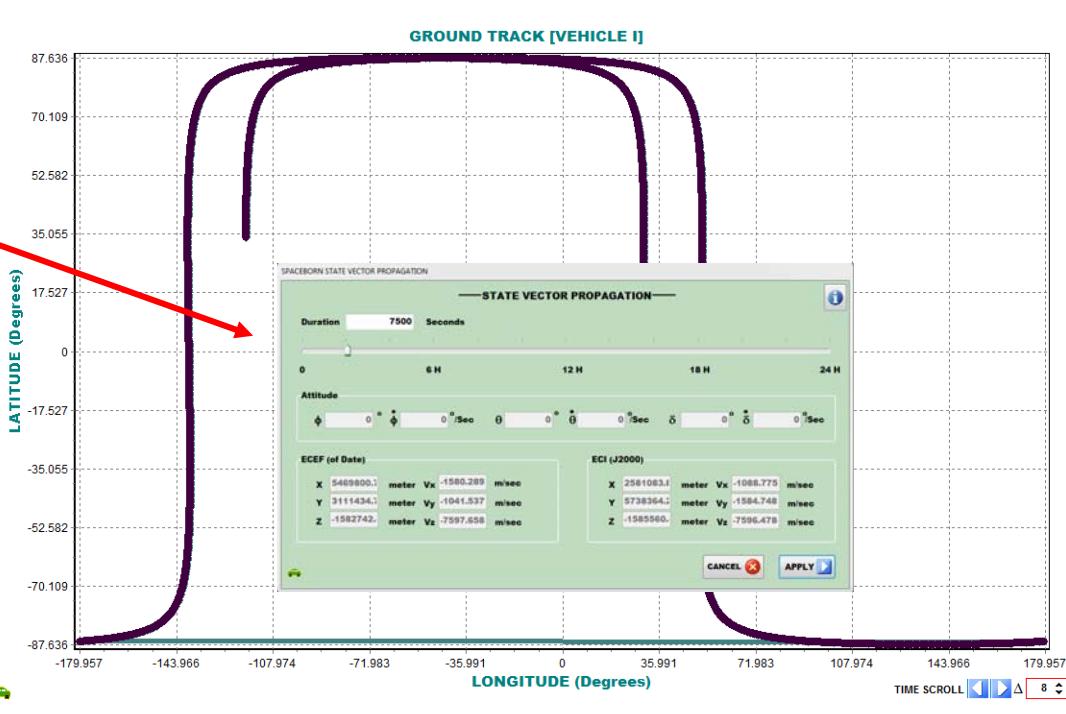
SPACEBORNE MANEUVERS

Tapestry simulates Spaceborne Vehicles in Earth Orbits. Unlike the Terrestrial Maneuvers, Spaceborne Maneuvers are not analytic and a coupled 6th order state vector equation is integrated. The Gravity model used conforms to WGS84 with three harmonics. Drag, spin, orientation, and thrust can all be specified. You may work in ECEF or Earth Centered Inertial (ECI) referenced to the J2000 epoch.

Switch to the Orbital (spaceborne) Maneuver-Keypad by using the **Preferences** or **Location** button and select **Spaceborne Script Motion Interface**. The following Maneuver Keypad will appear from which you access the state vector propagation form .



Check this to display Spaceborne KEYPAD





IMPORT VEHICLE MOTION

The screenshot shows two windows from the Tapestry Tools software:

- Top Window (Import Trajectory):** A green dialog box with a "Import Trajectory" button. To its left is a vertical toolbar with buttons for "Shapes & Routes", "Import Trajectory" (highlighted with a red box), and "Application Models". Below the toolbar is a table titled "Script Sequence" with several rows of data.
- Bottom Window (Import Truth Data):** A main configuration window with the title "IMPORT TRUTH DATA". It includes a "BACK" button, a "Browse Scenario" button, and a "CLEAR IMPORT" button. On the left, there's a list of file types: "Motion File [Week Sec Geodetic]", "Motion File [Week Sec ECEF]", "Motion File [Sec ECEF]", "Motion File [SCS2450 ECEF]", "Motion File [50Hz Sec ECEF]", "NavData Recorder File [BIN]", "TAPESTRY TRAJECTORY [BIN]", and "VOYAGER TRAJECTORY [BIN]". On the right, there are buttons for "COCKPIT LOG FILE", "(1 Hz) Motion File [Week Sec ECEF]", "(1 Hz) Motion File [Sec ECEF]", "MEVTP (.TRJ) to [Sec ECEF]", and "Route File [NMEA/GGA]". At the bottom of the window, there are several checkboxes with descriptions:
 - Initial State Equal to First Processed Record
 - Synch NAVDATA consistent with Start Time
 - Skip the FIRST line in the import File
 - Fill in missing Attitude Data, Roll = 0

A red box highlights the "Import Trajectory" button in the top window, and a red bracket on the left side of the bottom window indicates where to insert a "stationary" pad.

IMPORT Vehicle motion is a gateway for the end-user to develop their own motion profile and incorporate it into the Scenario.

See this document for the Format and other Information
[IMPORTTRAJECTORYFILE.PDF](#)



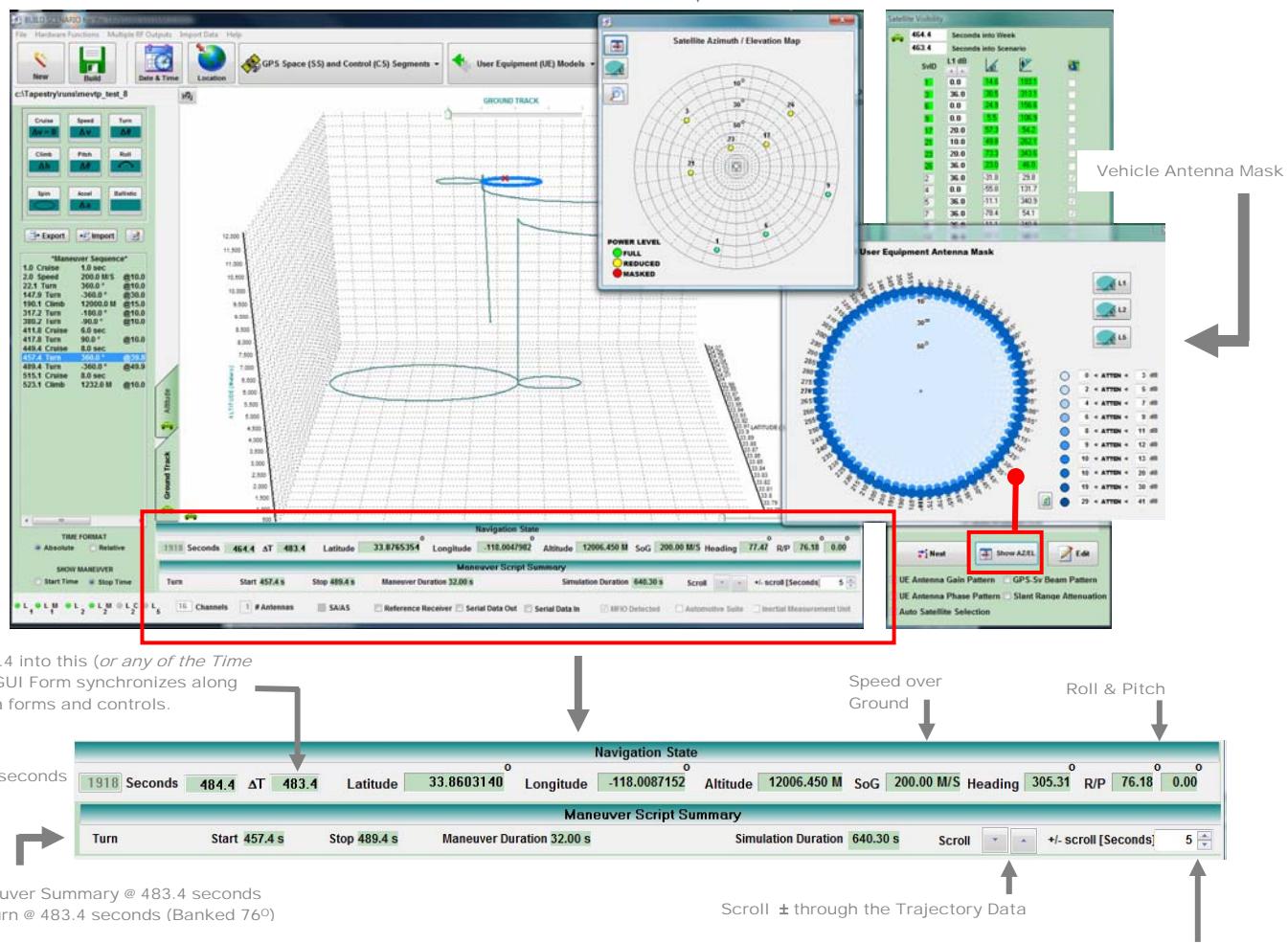
SUMMARY PANELS

DISPLAY PANELS

Clicking on the plot display, the Maneuver Script, the Scroll ± buttons, or entering the epoch into one of the time edit controls, results in Tapestry synchronizing all of the data forms and displaying a Summary in the **Maneuver Script Summary Bar** and **Navigation State Bar**. These two summary bars are located just below the **Plot Display**.

For example, the display captured below (*how the azimuth/elevation plots are accessed is explained in the section on the Satellite Visibility Display*) shows the contents of the GUI at Time = 483.4 Seconds into Simulation.

The AZ/EL map displays the synchronized attenuation given the vehicle dynamics and Antenna Mask (note Vehicle is banked 76° masking the satellites to the NORTH)



If you have imported a Vehicle Trajectory, the Maneuver Script Display is replaced with the Import Summary Bar





SUMMARY PANELS

INFORMATION PANELS

COMPLEX3D

- Routes & Waypoints
- Import Vehicle Motion
- Programmable Shapes
- Scripted Vehicle Motion

cycles thru panels →

ATTITUDE

ROLL	0.00°	(<input type="radio"/> R)	0.00 o/s
PITCH	0.00°	(<input type="radio"/> P)	0.00 o/s
YAW	180.0°	(<input type="radio"/> Y)	0.00 o/s
HEAD	180.0°	(<input type="radio"/> H)	

Deg/Sec Hz

VELOCITY

500 m/s 5 G

Y 181°
Vg Vv Acc
ALT 111963.9 R 0

SCENARIO FILE ACCESS

BROWSE

TAPCONTROL.INI

ANTENNA ASSIGNMENT

RF 1	<input checked="" type="radio"/>	RF 2	<input type="radio"/>	RF 3	<input type="radio"/>	RF 4	<input type="radio"/>

LINK CONFIGURATION

L 1	<input type="radio"/>	L M 1
L 2	<input type="radio"/>	L M 2
L 5	<input type="radio"/>	L C 2

AS-BIT

ECDF

X	-2480310.2 M
Y	-4673658.1 M
Z	3553362.7 M
VX	26.3 M/S
VY	49.5 M/S
VZ	82.9 M/S

NAVIGATION STATE @ TIME MARK START STOP

TIME DISPLAY FORMAT

ABSOLUTE RELATIVE

SHOW MANEUVER

START TIME STOP TIME

Display time in Seconds-into-Simulation or Absolute Time.

START displays the Initial conditions of the maneuver
STOP displays the Terminal conditions of the maneuver

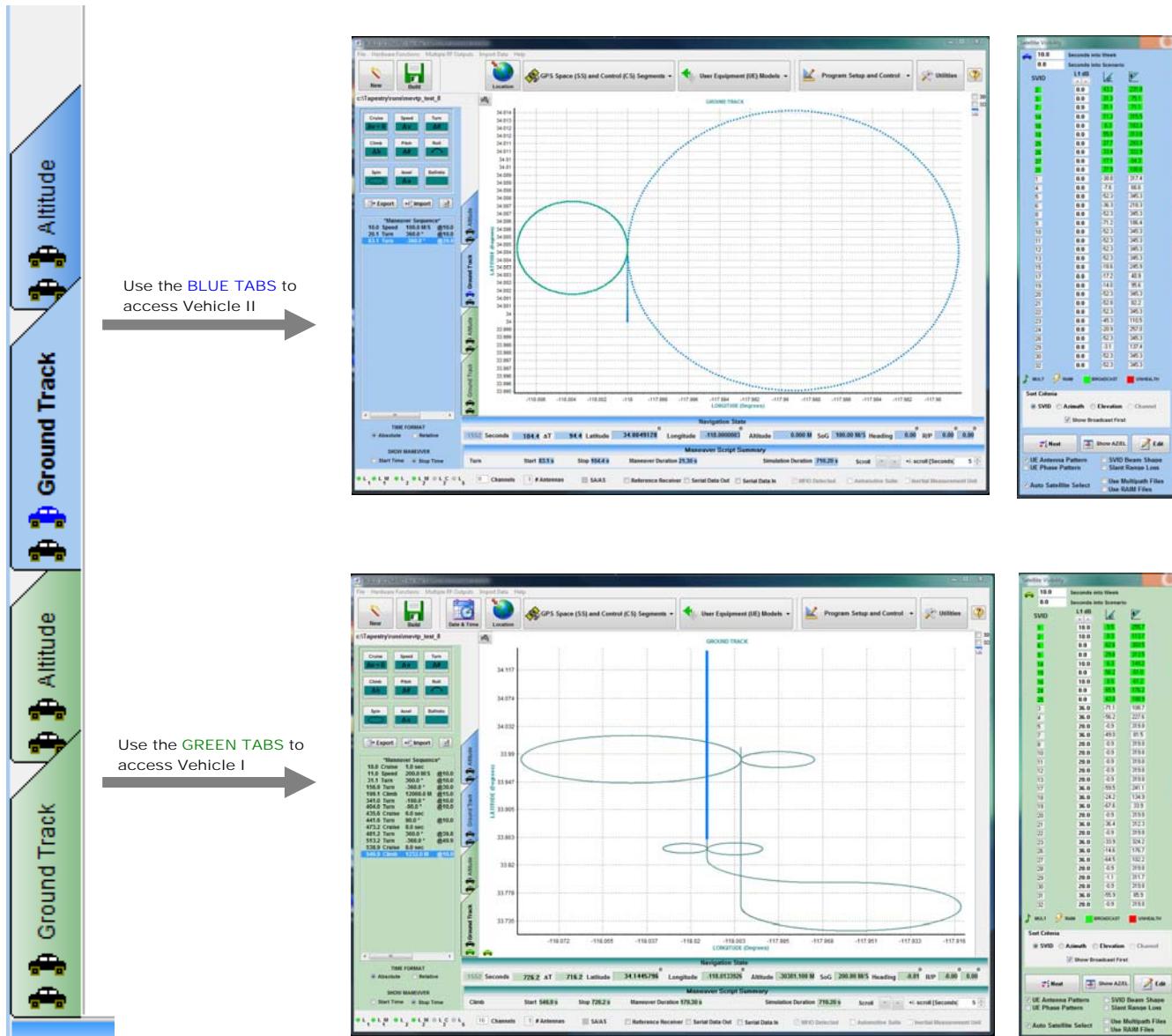


PLOTTING PANELS

ELEMENTS OF THE PLOT DISPLAY

The plot display dominates the MAIN SCREEN of the ***Build Scenario***. For power users creating event driven simulations, the plot screen provides a gateway to advanced functions and displays.

The plot display is synchronized though a mouse-click-handler such that ALL data forms, displays, and summary bars will display data associated with the point you have clicked on the screen. You may also browse-in-time through the vehicle motion profile accessing the simulation event timeline.



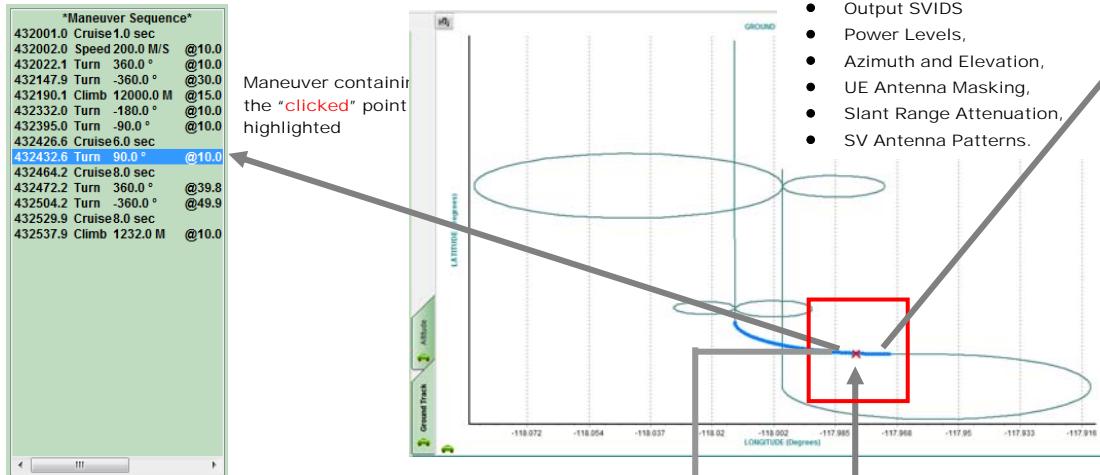
NOTE: If you don't have multiple RF outputs, the **BLUE TABS** will not be accessible.

PLOTTING PANELS

BROWSING

The Plot Display is synchronized with all data forms within Tapestry. The simulation timeline, reflected in the Navigation State Summary Bar, can be browsed in several different ways. As you browse, the complete simulation time line is displayed on:

MAIN FORM



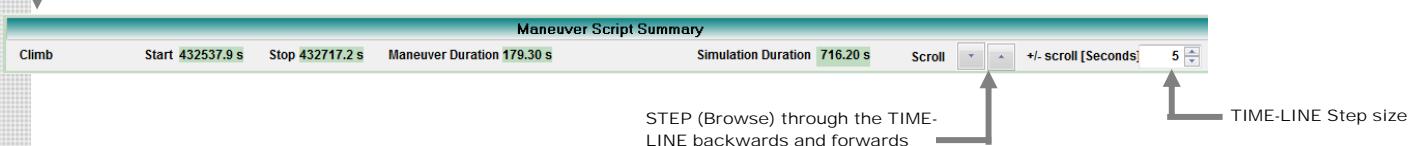
SVID	Seconds into Week		Seconds into Scenario	
	L1 dB	2012	2013	2014
1	26.0	-52.4	12.0	
3	26.0	-47.0	260.7	
4	26.0	-29.3	59.6	
5	26.0	-37.0	327.6	
6	26.0	-17.8	156.4	
7	26.0	-68.7	142.3	
8	26.0	-30.6	119.3	
10	26.0	-34.8	209.6	
11	26.0	-63.0	31.8	
13	26.0	-25.6	303.2	
14	26.0	-34.5	219.5	
18	26.0	-57.6	210.0	
20	26.0	-51.1	261.4	
21	26.0	-8.0	198.7	
22	26.0	-47.9	255.2	
23	26.0	-58.0	257.4	
26	26.0	-3.2	154.8	
27	26.0	-57.8	135.8	
28	26.0	-32.5	139.2	
29	26.0	-23.7	228.8	
30	26.0	-11.6	142.5	
31	26.0	-30.6	115.9	
32	0.0	0.0	0.0	

"Clicked" Maneuver summary

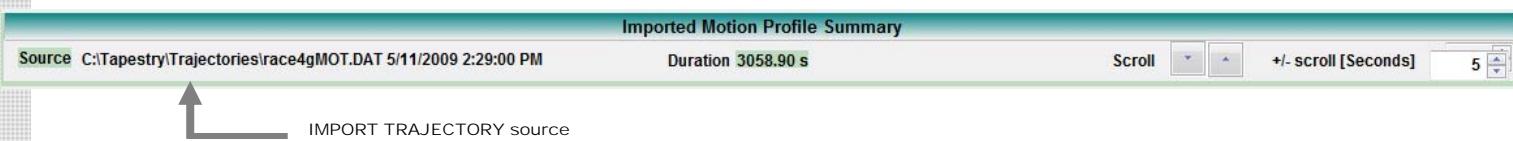
NAVIGATION STATE SUMMARY

Navigation State											
1552	Seconds	432437.0	ΔT	436.0	Latitude	33.7942165	Longitude	0°	-117.9792781	Altitude	-13486.450 M

MANEUVER SUMMARY BAR

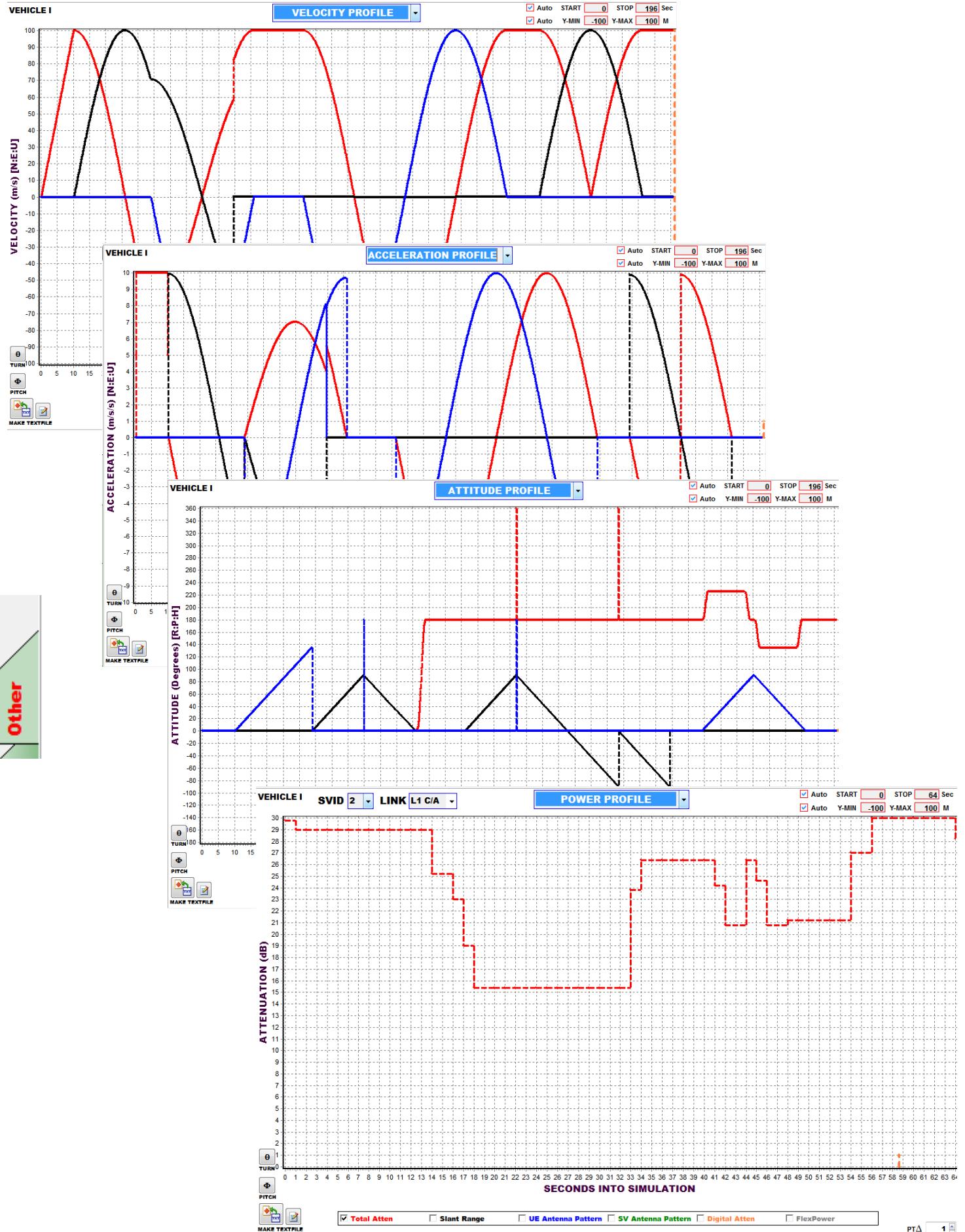


If you have IMPORTED a vehicle trajectory file, the Maneuver Summary Bar is replaced with the **Imported Motion Profile Summary Bar**





PLOTTING PANELS

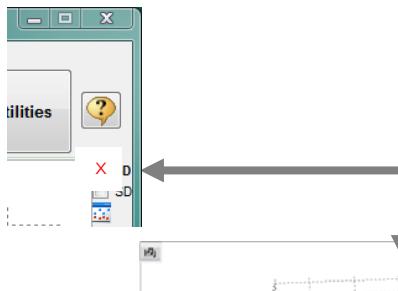




PLOTTING PANELS

3D DISPLAY

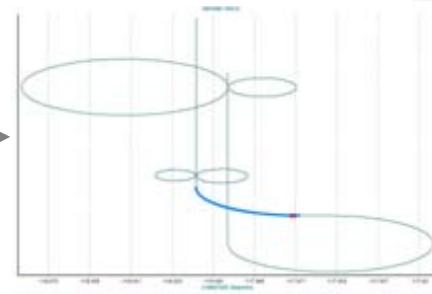
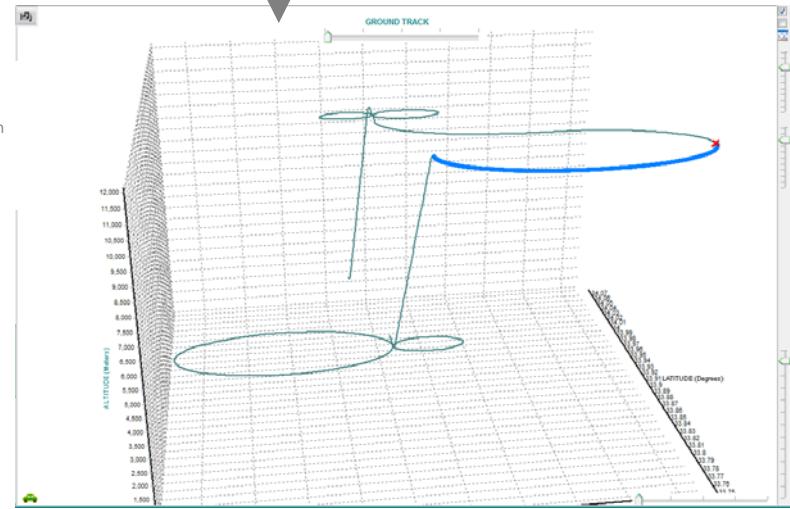
A Three dimensional display is available on the primary vehicle (Vehicle I). To access this feature, locate the CHECKBOX in the upper right hand corner of the Plot Display.



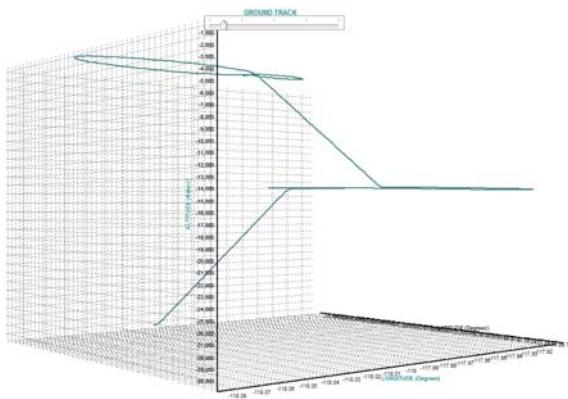
NOTE FROM AUTHOR: If you wrap yourself around a pole in 3D – go back to 2D and click in the center of the plot and the Display will reset!

This is the SAME trajectory as shown on the previous page. 3D plotting provides a more comprehensive display of the flight profile.

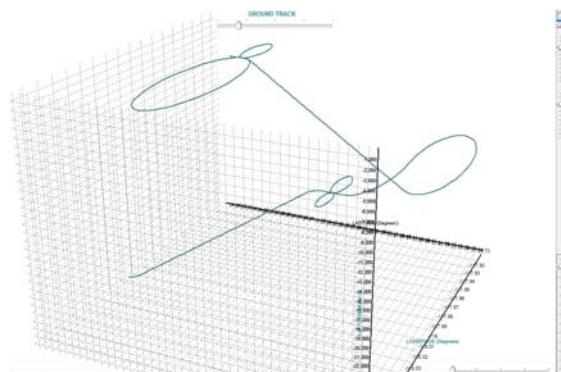
(However, the longer the simulation the more sluggish the response)



ROTATE



ZOOM



TILT

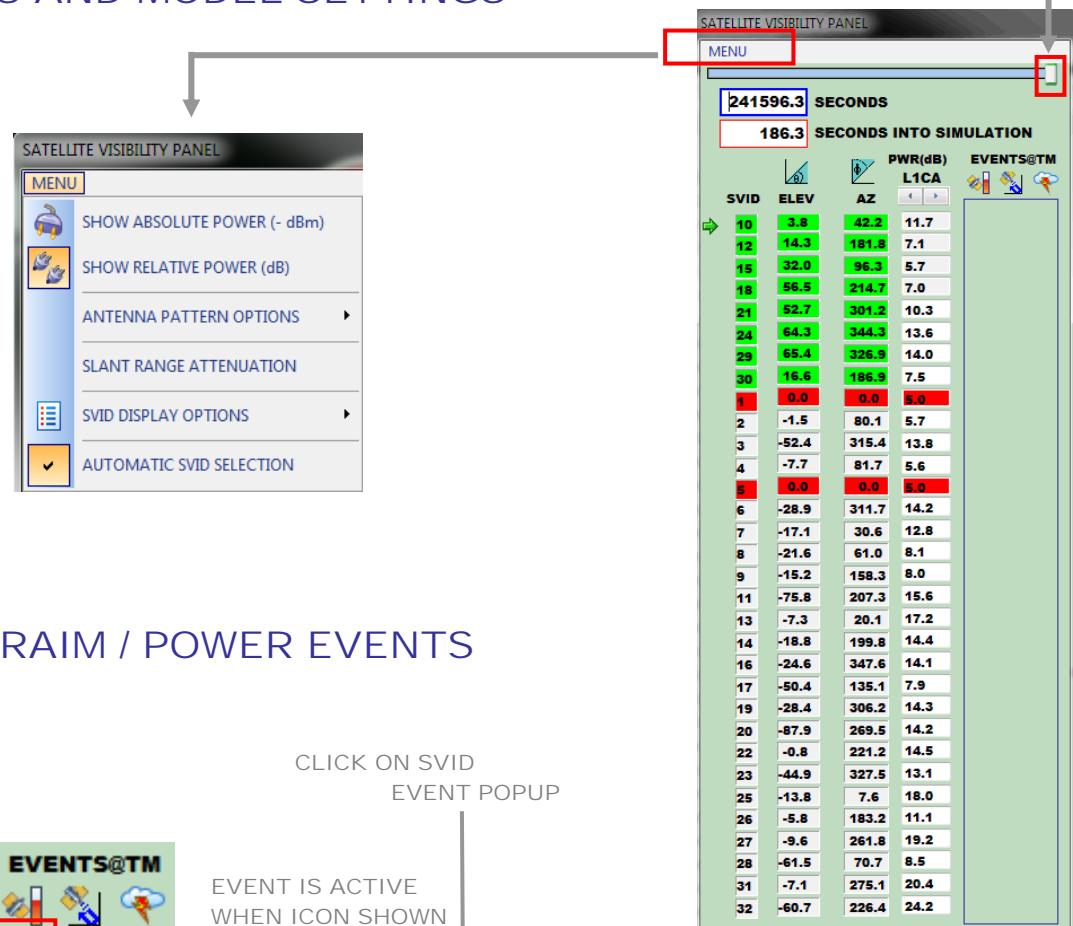
If you should want a plot of the Vehicle Trajectory, within the **Scenario** Folder you will find the plot display saved as a Windows Media File (WMF) that can be inserted into a document.



SATELLITE VISIBILITY PANEL

PREFERENCES AND MODEL SETTINGS

SLIDE TO SET TIME



MULTIPATH / RAIM / POWER EVENTS

CLICK ON SVID

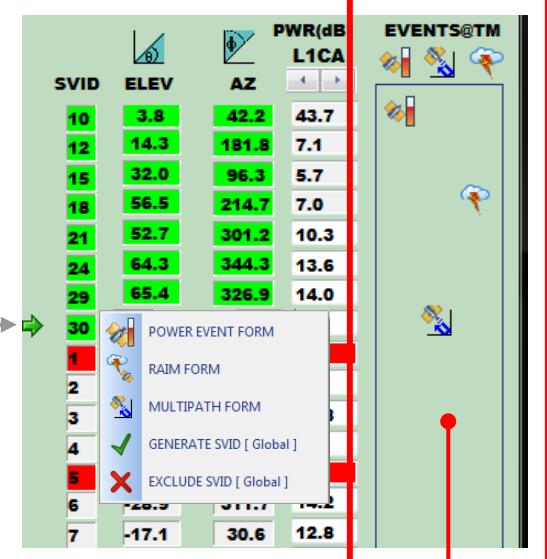
EVENT POPUP

PROGRAMMABLE POWER
[SETTINGOUTPUTPOWERLEVELS.PDF](#)

PROGRAMMABLE RAIM
[USINGRAIM.PDF](#)

PROGRAMMABLE MULTIPATH
[HWMULTIPATH.PDF](#)

EVENT IS ACTIVE
WHEN ICON SHOWN



EVENT WINDOW TIME-LINE

Programming POWER, MULTIPATH and RAIM details;

[SETTINGOUTPUTPOWERLEVELS.PDF](#)

[HWMULTIPATH.PDF](#)

[USINGRAIM.PDF](#)

PROGRAMMABLE POWER LEVELS

PROGRAMMABLE POWER EVENT

TIME OF APPLICABILITY 73.6 ΔT 63.6 Seconds **RF OUTPUT** 1 - ALL
 LOCK SVID CONTROLS

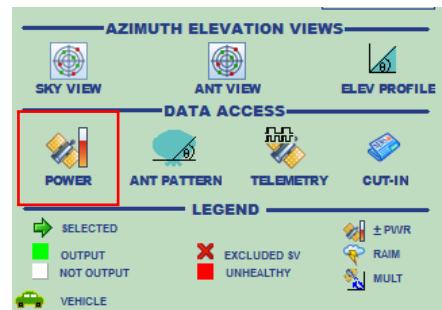
SVID OUTPUT CONTROL

SVID OUTPUT
SATELLITE 2 - **GENERATED** ADD REMOVE **ELEVATION** 6.0° **AZIMUTH** 187.5°

POWER LEVEL EVENTS

POWER CHANGE EVENT
SATELLITE 2 - ALL ENABLE EVENT
 LOCK
L₁ 0.0 dB L₂ 0.0 dB L₅ 0.0 dB
DURATION INTERVAL 0 sec HENCEFORTH
TOA 63.6

RANDOMIZED POWER PROFILE
SATELLITE 2 - ALL ENABLE EVENT
 RANDOM **ATTENUATION** 0.0 dB **INTERVAL** 0.0 sec **WIDTH** 0.0 sec
 RANDOM RANDOM RANDOM
VEHICLE **CANCEL** **APPLY**

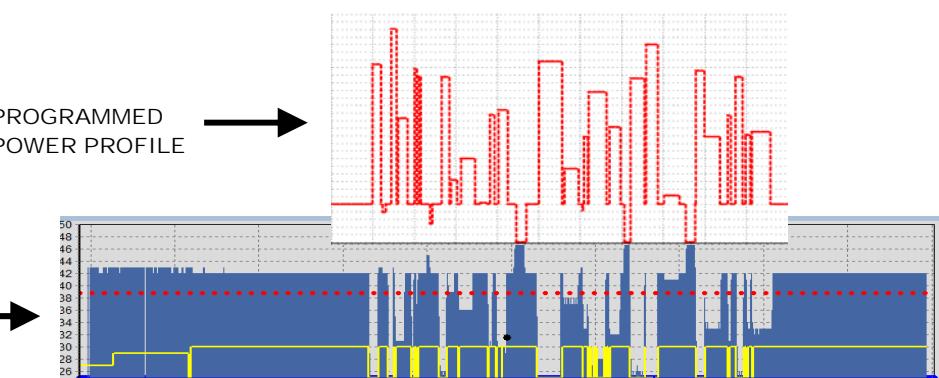


Power can be controlled for L1C/A, L1P, L2P, L2C, and L5, ML1, and ML2.

RANDOMIZE power provides a method for simulating a varying power environment due to partial blockage, foliage, or some other attenuation media.

Follow this link for details
[RANDOMATTENUATION.PDF](#)

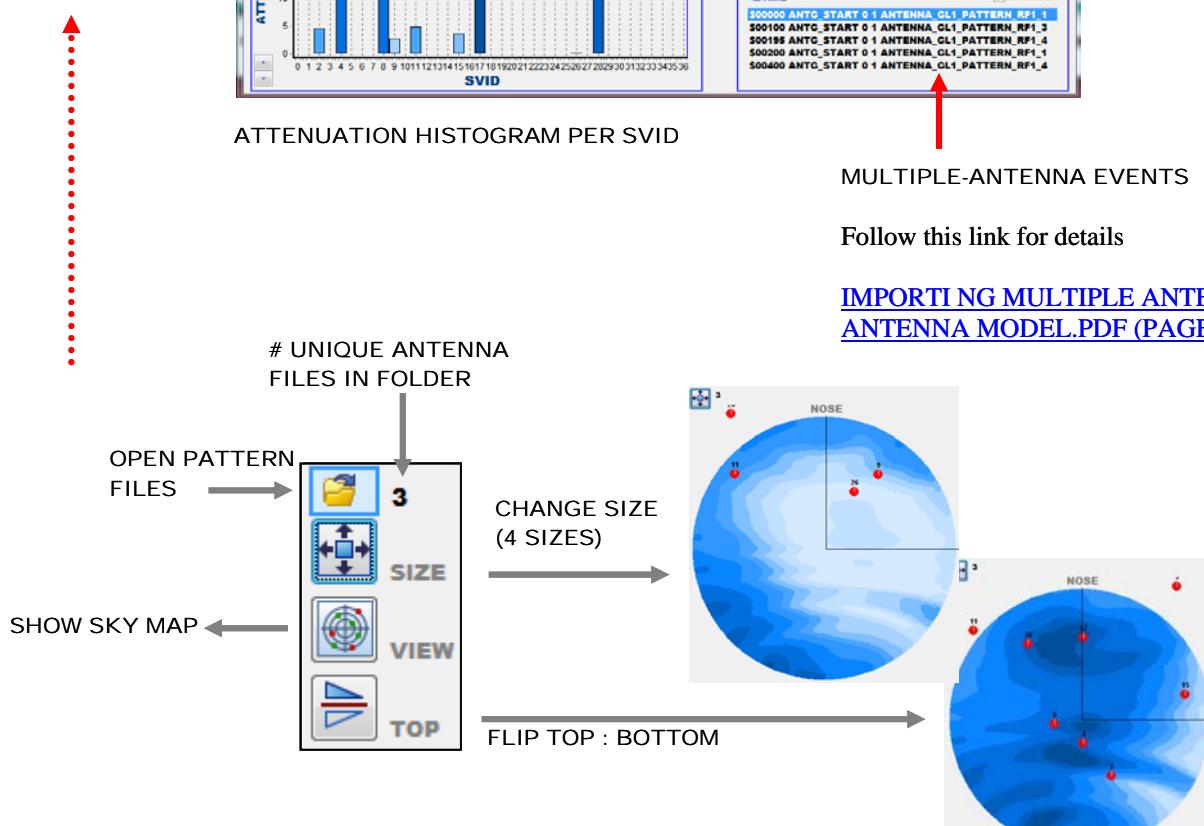
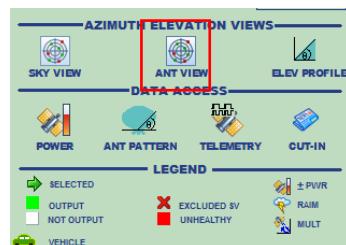
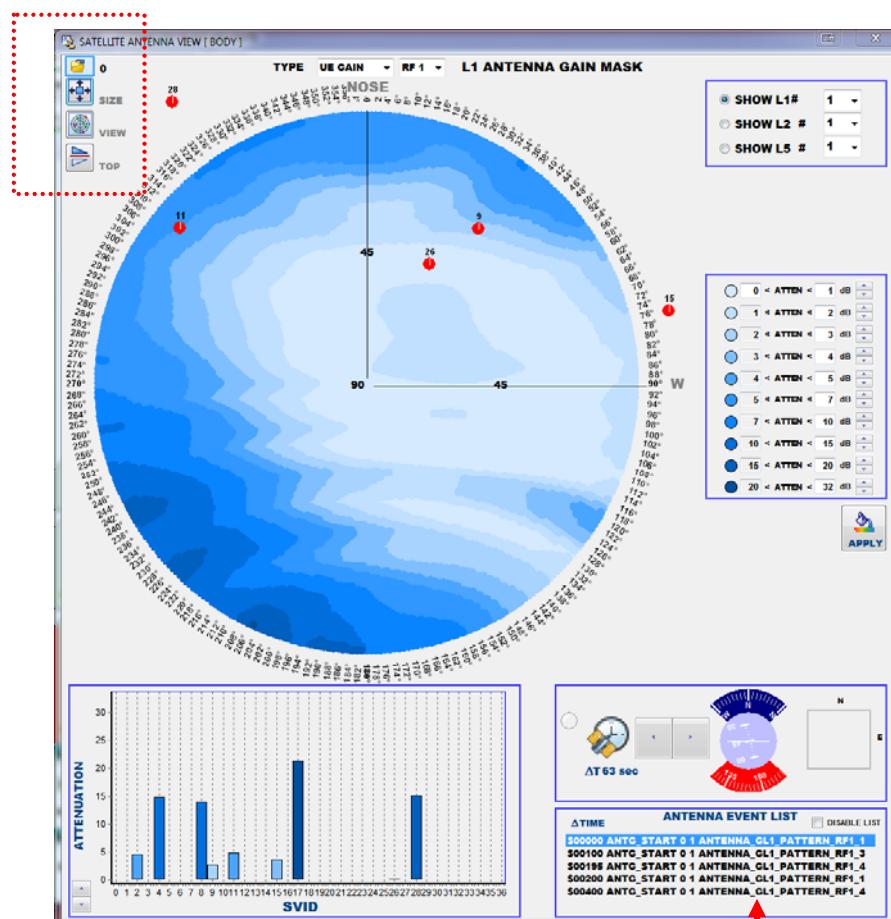
PROGRAMMED
POWER PROFILE



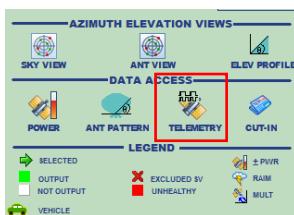
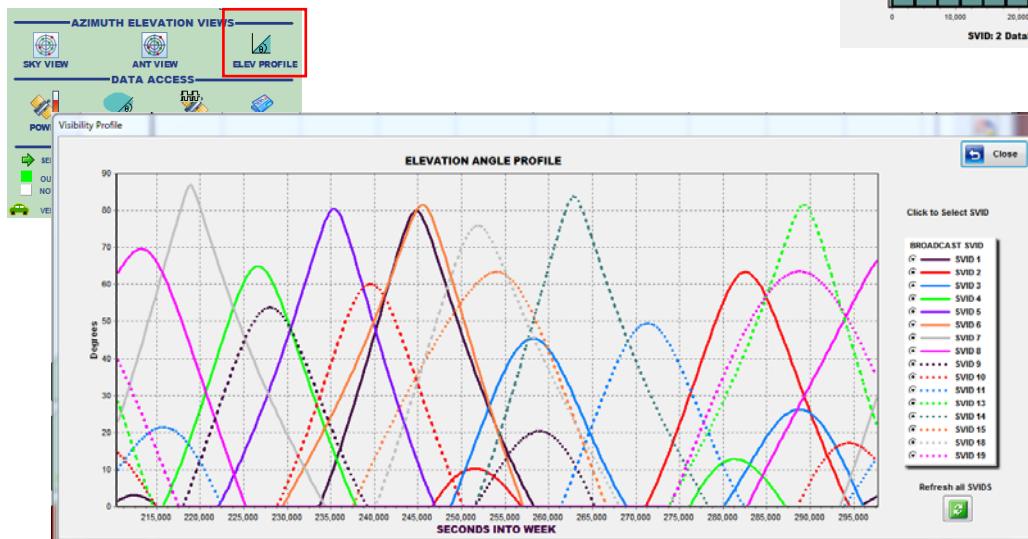
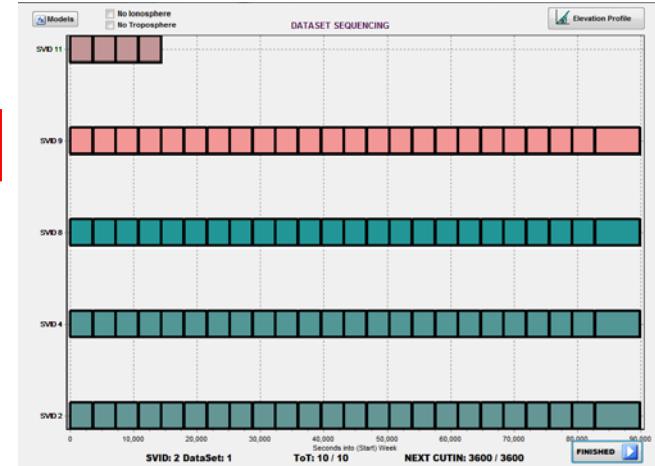
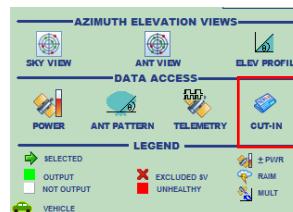
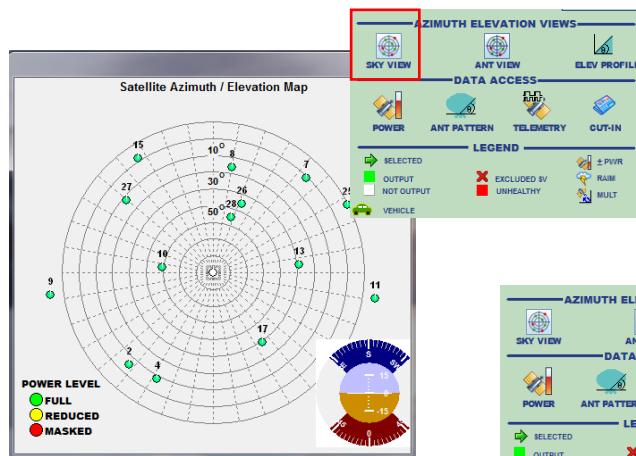


SATELLITE VISIBILITY PANEL

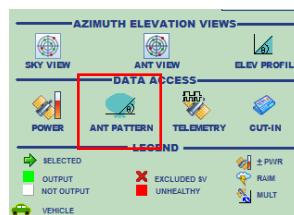
ANTENNA PATTERN VIEWER



SATELLITE VISIBILITY PANEL



<C:\TAPESTRY\DOCUMENTATION\MANUALS\USINGSATDBASEEDITOR.PDF>



<C:\TAPESTRY\DOCUMENTATION\MANUALS\ANTENNAMODELING.PDF>



APPENDIX: MULTIPLE VEHICLES

Two Vehicles and the Sensor Models

The Tapestry system can simulate two dynamic vehicles each with their own independent error modeling, parameterization, and host vehicle configuration. The following table differentiates the Tapestry modeling that is vehicle specific from those that are vehicle independent.

Tapestry Modeling For Two Vehicles	Varies per Vehicle	Same per Vehicle	
Start Time		■	Both Vehicles must start at the <u>same</u> time
Initial State Vector	■		Vehicles <u>do not</u> have to start with the <u>same</u> initial conditions
GPS Space and Control Segment:			
Telemetry		■	Data bits and Messages are the <u>same</u> for both Vehicles
Range Models	■		
SV Antenna Pattern		■	
RAIM and T-RAIM		■	
Signal Configuration	■		Multipath is <u>different</u> for each Vehicle.
Multipath	■		
User Equipment Models:			
Automotive Dead Reckoning ...	■		
Antenna Gain Pattern	■		
Antenna Phase Pattern	■		
			Each Vehicle could have <u>different</u> Sensors. E.g. Vehicle I could have an HG1700. Vehicle II an LN200 SDLC. Or, both could be HG1700 with <u>different</u> error characteristics.
Inertial Measurement Unit	■		
ICD-GPS-059 INS	■		
Ref. Receiver.....	■		
		RF 1	

To facilitate keeping track of which error models apply to which Vehicle, Build Scenario implements the following color scheme throughout the user interface.

1 RF Output

1 Simulated Vehicle denoted by a Green Icon:



2 RF Output

1 Simulated Vehicle denoted by a Green Icon:



1 Simulated Vehicle denoted by a Blue Icon:



When Build Scenario is displaying a vehicle specific data form, the background color of the form will reflect the *Active Vehicle*. To change the *Active Vehicle*, select the appropriately colored Tab on the plot display. In addition, an appropriately colored Vehicle Icon is displayed on forms that apply to a specific vehicle. If a particular data form is in Gray, then this model is independent of vehicle. For example GPS Sub-Frame data; both Vehicles would download the same data bits and messages.



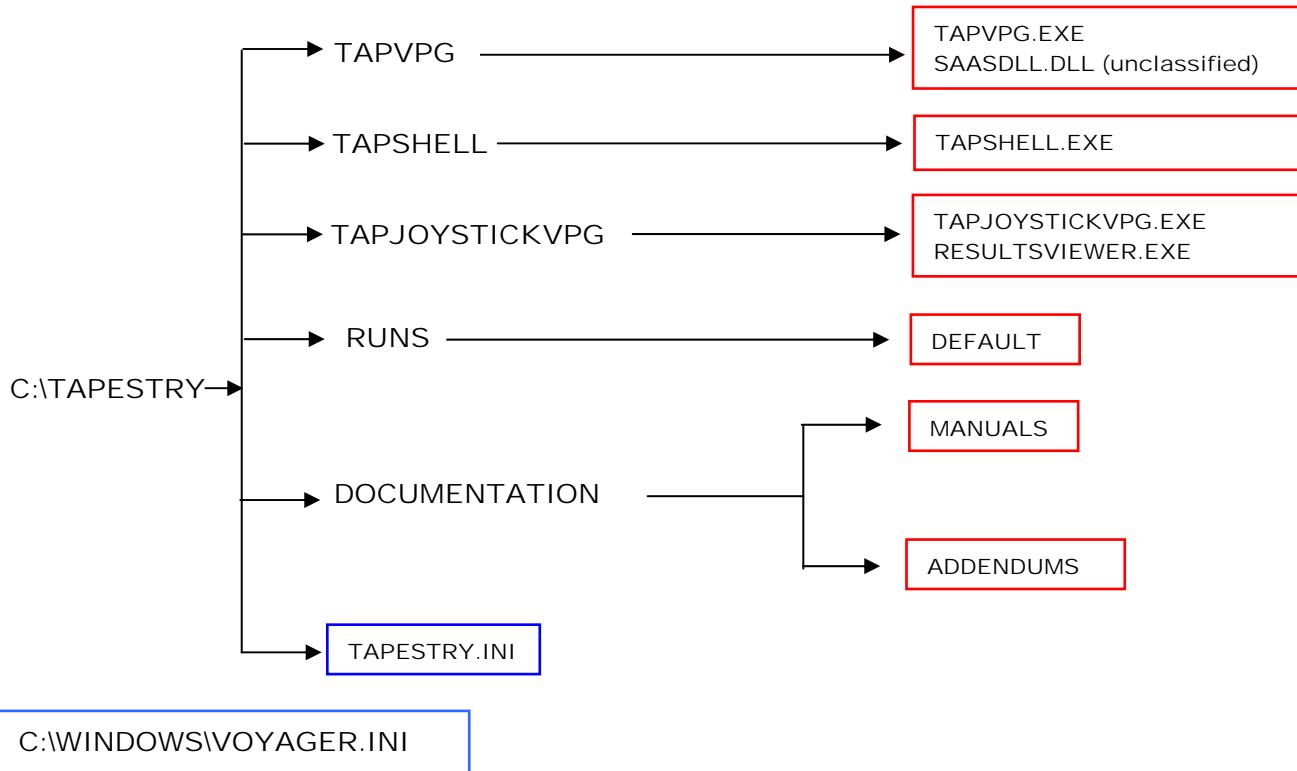
APPENDIX: INSTALLING TAPESTRY ON A COMPUTER

PORING TAPVPG TO ANOTHER COMPUTER

BUILD SCENARIO for the Tapestry system is a windows application. You may install copies of BUILD SCENARIO on computers within your facility to be used exclusively to create Scenario Folders that can be transferred to the simulation hardware or to support simulator use.

Do so as follows:

HOST MACHINE (Tapestry Simulator)



Create the folder structure shown above on the TARGET Machine – all **RED** items are File Folders and you should copy the entire contents to your machine. – **BLUE** items are FILES that must be copied.

- Set the TARGET machine Resolution to **1900 x 1200**
- Copy any desired SCENARIO FOLDERS from the HOST machine to the TARGET machine. The must hang off the RUNS folder and DEFAULT is required.