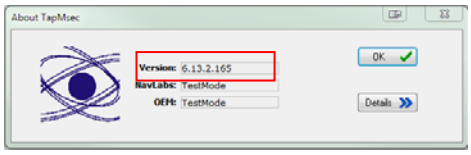
# USING RUN SCENARIO

**RUN SCENARIO** for the Tapestry System is the Windows Application that controls the output of the composite GPS RF signal to the N connector on the front of your chassis. **RUN SCENARIO** reads the Scenario Data Base, coordinating and synchronizing the data for output.

Access **RUN SCENARIO** from **TAPESTRY SHELL** on the computer desktop. The **RUN 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**

## Scope

The Tapestry system is a software suite developed to provide a modeling and control gateway to the NAVLABS LABPRO Legacy and Modernized Global positioning System Constellation Simulators. Tapestry is Windows based and designed to combine multiple sensors seamlessly with the GPS RF output signal. Data is organized in standard windows folders we call **Scenarios**[1].

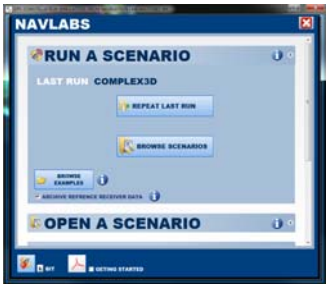
The Tapestry system is a *two step* process. Use **BUILD SCENARIO** to construct the Scenario and **RUN SCENARIO** to generate the RF Output.

**RUN SCENARIO** is responsible for interacting-with, and controlling, the RF Hardware, the computer Serial Ports, any special purpose expansion cards, and the Receiver Under Test. In addition, while not apparent to the user, **Run Scenario** maintains the run-time code and carrier phase calibration of the hardware.

This document provides a guide and reference to the use of ***RUN SCENARIO.***

[1] **Scenarios** are an organizational scheme we use to separate one-simulation-from-another by grouping them in Windows Folders off of c:\Tapestry\Runs.

# USING RUN SCENARIO




Access Run Scenario through TAPESTRY SHELL. Click on the Scenario to run and RF Output will commence as signaled by the rising 1-PPS output. With completion of the Simulation, Run Scenario will close and return to the TAPESTRY SHELL Main Menu.

While no interaction with RUN SCENARIO is required, real-time access to simulation Truth Data, Hardware Status, Reference Receiver, and informative graphic displays are available.

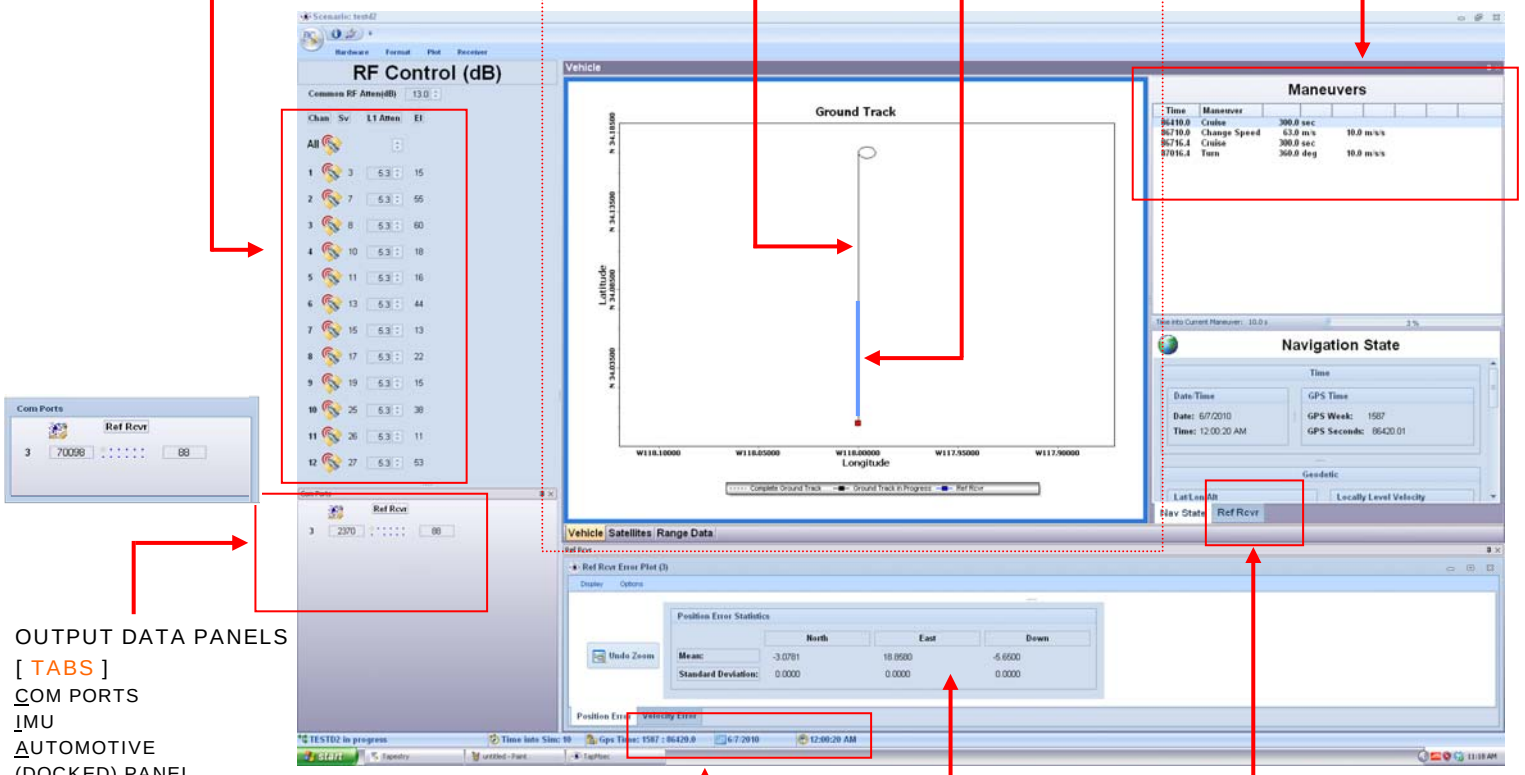
GRAPHIC DISPLAY AREA

CHANNELIZED SVID AND POWER DISPLAY

REFERENCE RECEIVER OVERLAY

TRUTH GROUND TRACK

MANEUVER SEGMENTS COUNT DOWN

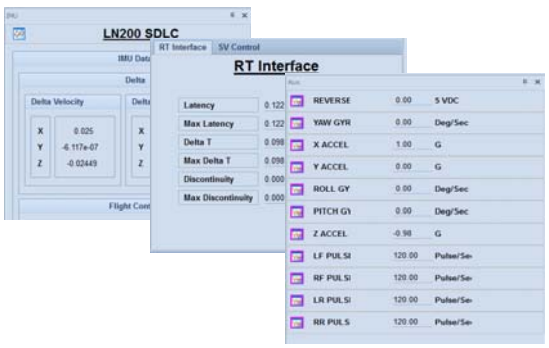



OUTPUT DATA PANELS
[ TABS ]
COM PORTS
IMU
AUTOMOTIVE
(DOCKED) PANEL

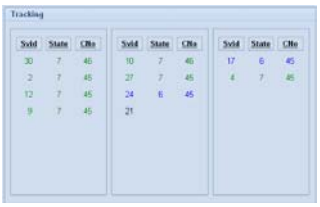
SIMULATION-TIME COUNT DOWN

REFERENCE RECEIVER TRUE - COMPUTED POSITION AND VELOCITY

[ TAB ] REFERENCE RECEIVER CHANNELIZED OUTPUT





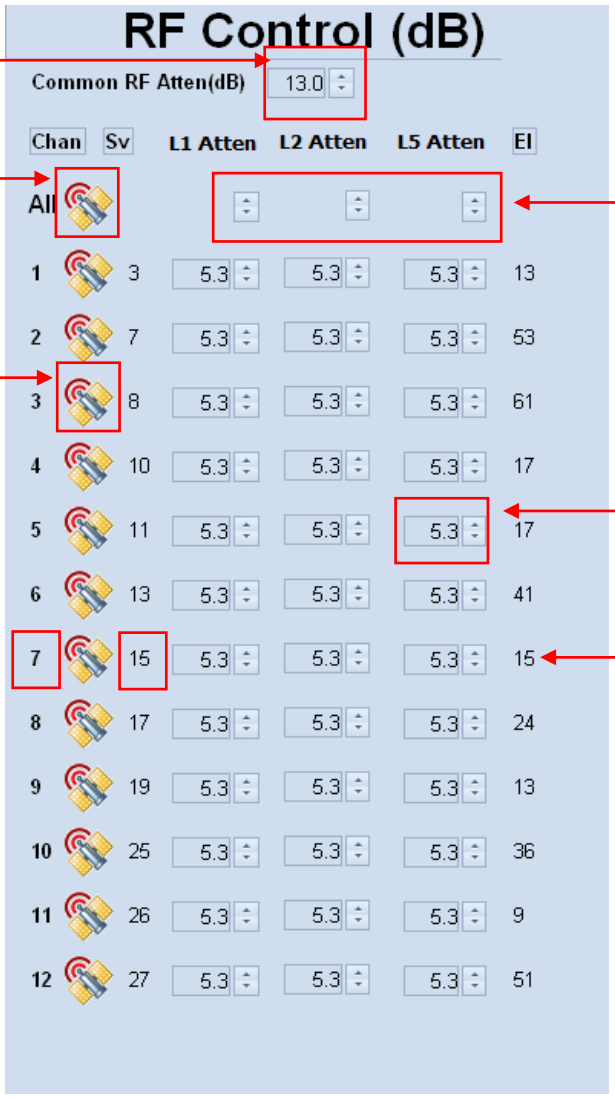


## CHANNELIZED SVID AND POWER DISPLAY

The output SVIDS, Output Power (Absolute or Relative per Preferences), and Elevation Angle are presented by Channel and Link. This is the only mechanism to adjust power real-time. The Power can be programmed situationally using Build Scenario.

This adjusts the ATTENUATION applied All channels and Links. It has a 34 dB dynamic range.

***Be careful with this control set. Overwhelmingly the most common technical support question we receive concerns overdriving your receiver. The Reference Receiver C/No < 45(ish)***




Use these up/down counters to adjust the power of All **Channels** for selected **Link**

Click this Icon to Set Maximum Attenuation for ALL CHANNELS and ALL LINKS

Click on this Icon to suppress output on this RF channel

This is the attenuation in dB applied to this Channel and Link.

CHANNEL 7 assigned SVID 15

Elevation angle in degrees. These are updated approx. every 300 seconds.

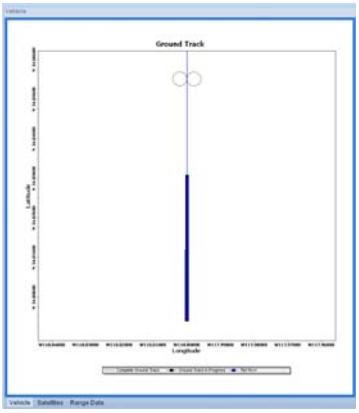
A darkened Icon means no satellite is assigned to this channel at this time.

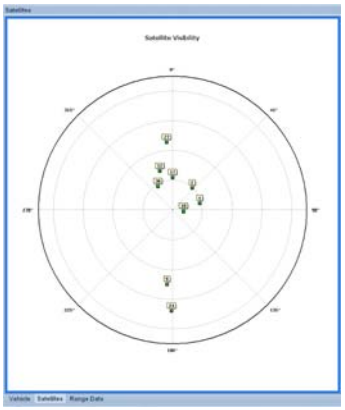
Nominally the output signal power is calibrated upon delivery and adjusted to be about –120 dBm (see your calibration documentation for the precise output power level). These controls are initialized with the ***Build Scenario*** application or real-time with the up/down counters.

Note that when you adjust the **Common RF Attenuation** control, we write a record into an initialization file. The next time ***Run Scenario*** executes, the last value for used for **RF ATTEN** is loaded into this control. Adjustment of the **Per-Channel Power** is not retained the next time you run the scenario. To change the per-channel attenuation use the **Build Scenario** application signal composition control.

# GRAPHIC DISPLAY AREA

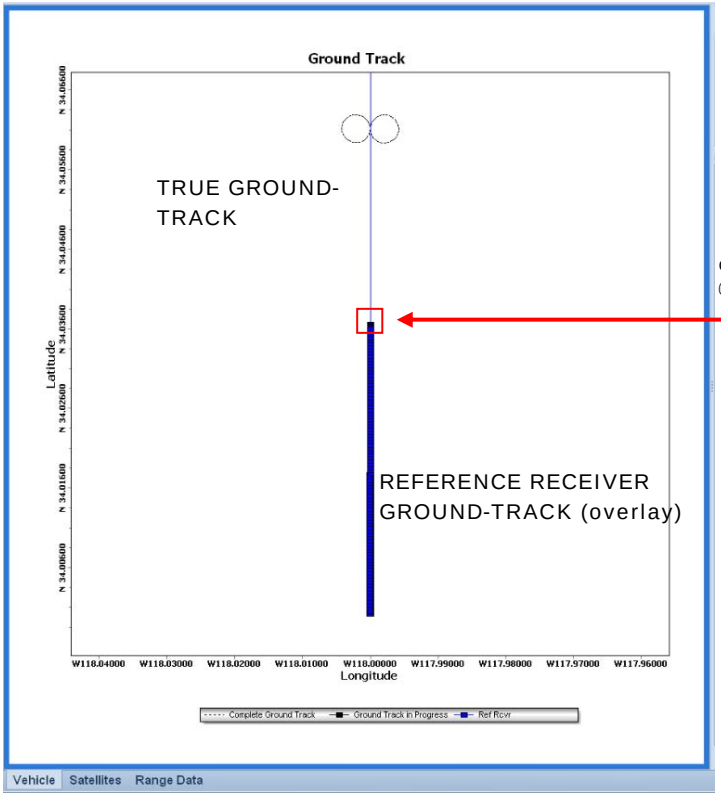
The Graphical Display is located in the center of the main display. Associated with the display is a list box that complements the data shown. Use the TABS to select the data to be displayed. These panels can be Docked (see last section).



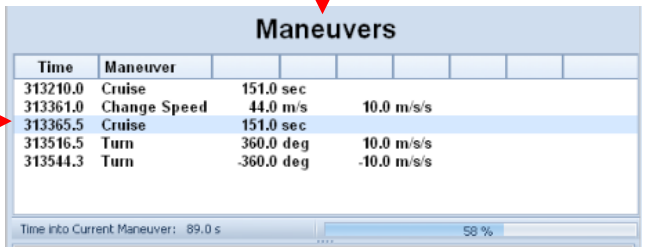






## GROUND TRACK DISPLAY

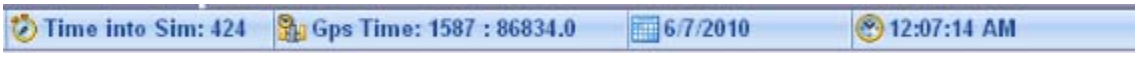



MANEUVER SEQUENCE COUNT DOWN




CURRENT @TIME MARK

TIME MARK



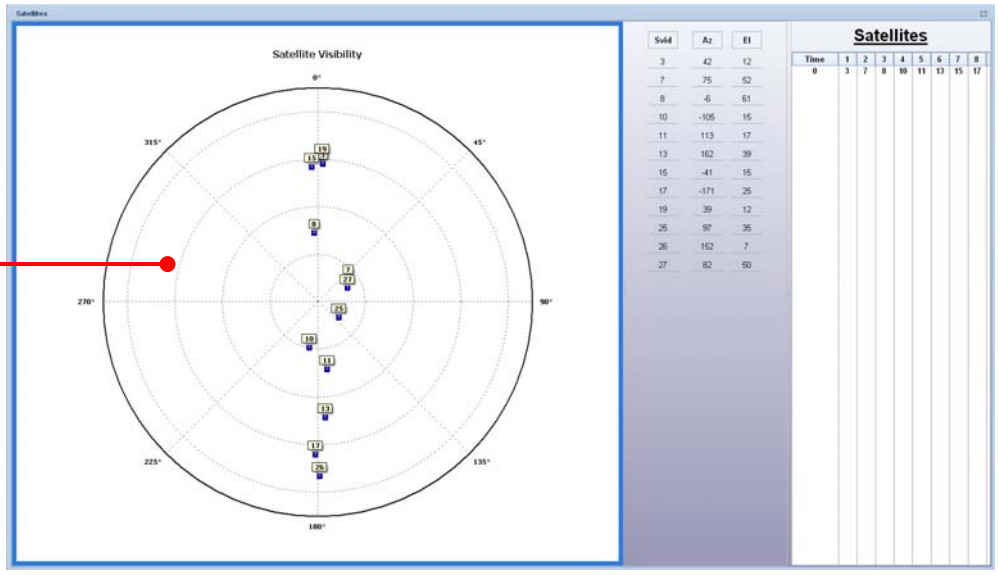

IF TIME IS NOT UPDATING, SIMULATION HAS FAULTED

Vehicle | Satellites | Range Data

## SATELLITE SKY VIEW

The **SATELLITES** tab on the Graphical Display shows a sky map of the broadcast satellites and a temporal list of the satellites to be broadcast as the simulation progresses. This panel can be Docked (see last section).

REAL TIME AZ/EL map of broadcast SVIDS

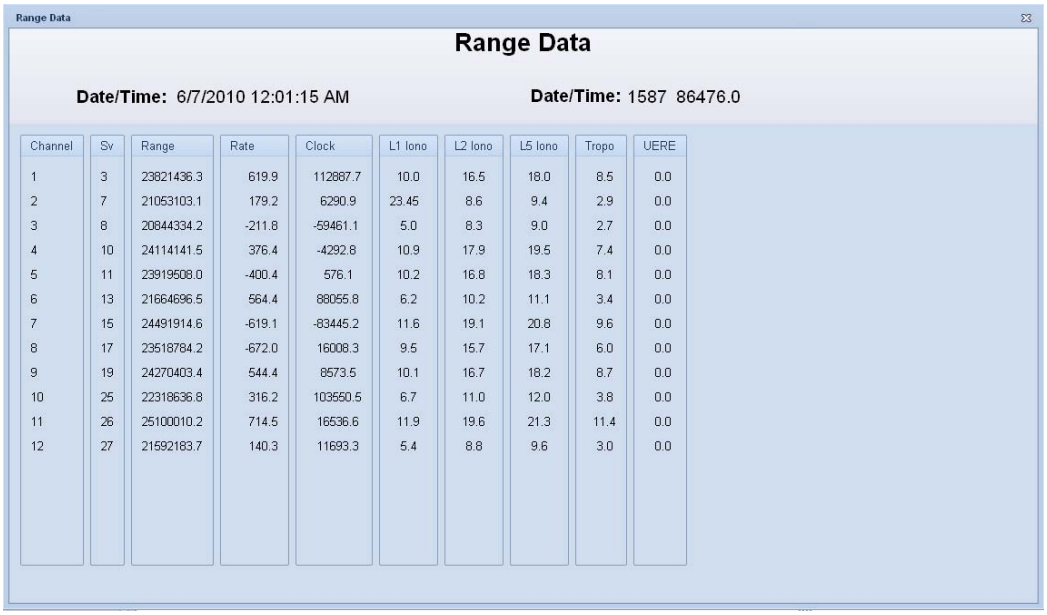



Satellites to be generated as the simulation progresses

Vehicle | Satellites | Range Data

## RANGE AND MODEL DATA

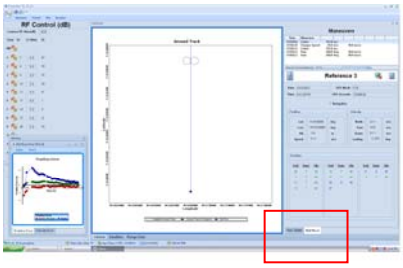
The **RANGE DATA** Tab presents the user with the **Broadcast-( Pseudo )Range Data**. Channelized data provides a model breakdown including Atmospherics, and other effects. This panel can be Docked (see last section).



Range Data

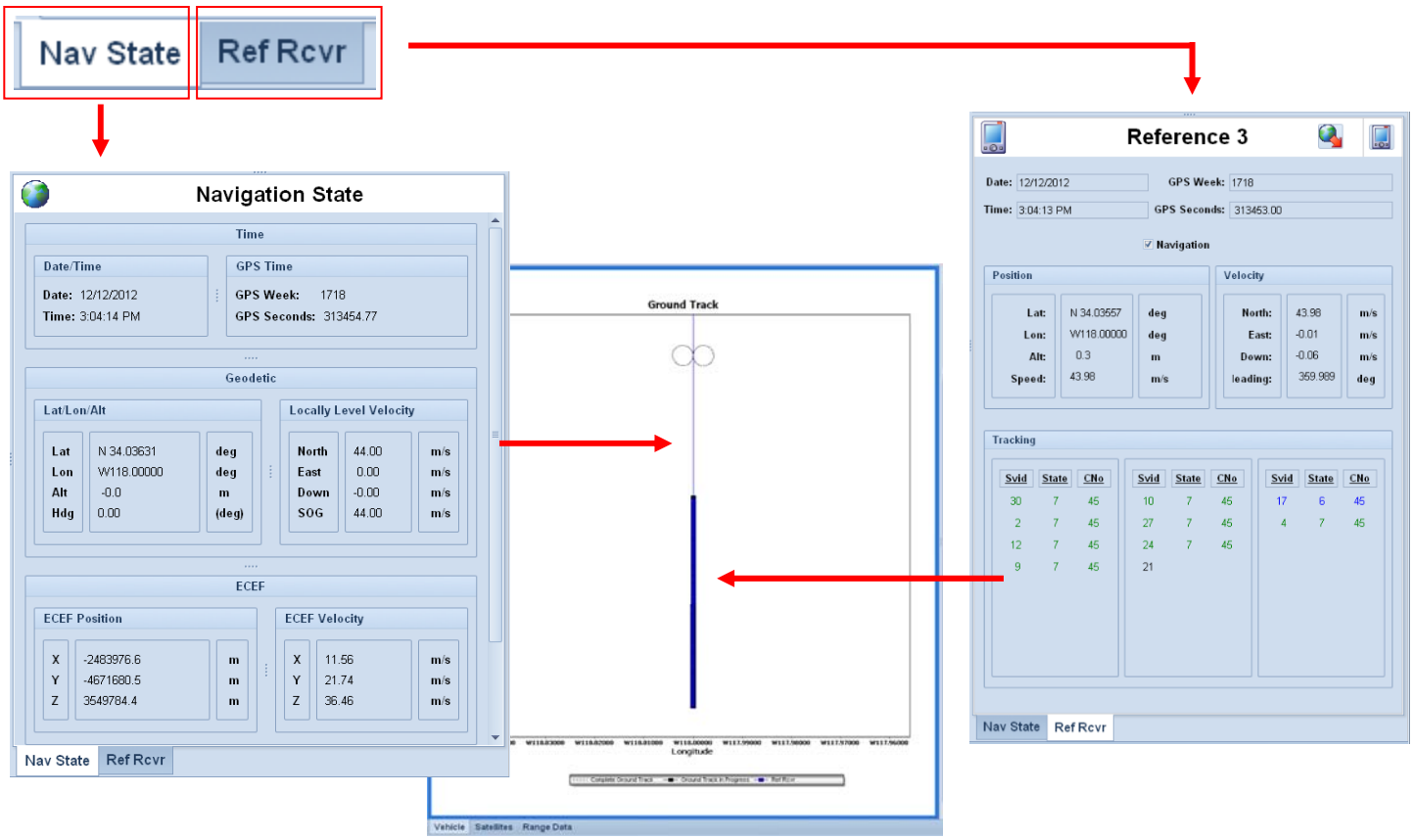
**Date/Time:** 6/7/2010 12:01:15 AM **Date/Time:** 1587 86476.0

| Channel | Sv | Range | Rate | Clock | L1 Iono | L2 Iono | L5 Iono | Tropo | UERE |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 3 | 23821436.3 | 619.9 | 112887.7 | 10.0 | 16.5 | 18.0 | 8.5 | 0.0 |
| 2 | 7 | 21053103.1 | 179.2 | 6290.9 | 23.45 | 8.6 | 9.4 | 2.9 | 0.0 |
| 3 | 8 | 20844334.2 | -211.8 | -59461.1 | 5.0 | 8.3 | 9.0 | 2.7 | 0.0 |
| 4 | 10 | 24114141.5 | 376.4 | -4292.8 | 10.9 | 17.9 | 19.5 | 7.4 | 0.0 |
| 5 | 11 | 23919508.0 | -400.4 | 576.1 | 10.2 | 16.8 | 18.3 | 8.1 | 0.0 |
| 6 | 13 | 21664696.5 | 564.4 | 88055.8 | 6.2 | 10.2 | 11.1 | 3.4 | 0.0 |
| 7 | 15 | 24491914.6 | -619.1 | -83445.2 | 11.6 | 19.1 | 20.8 | 9.6 | 0.0 |
| 8 | 17 | 23518784.2 | -672.0 | 16008.3 | 9.5 | 15.7 | 17.1 | 6.0 | 0.0 |
| 9 | 19 | 24270403.4 | 544.4 | 8573.5 | 10.1 | 16.7 | 18.2 | 8.7 | 0.0 |
| 10 | 25 | 22318636.8 | 316.2 | 103550.5 | 6.7 | 11.0 | 12.0 | 3.8 | 0.0 |
| 11 | 26 | 25100010.2 | 714.5 | 16536.6 | 11.9 | 19.6 | 21.3 | 11.4 | 0.0 |
| 12 | 27 | 21592183.7 | 140.3 | 11693.3 | 5.4 | 8.8 | 9.6 | 3.0 | 0.0 |



## NAVIGATION DISPLAY DATA (TSPI)

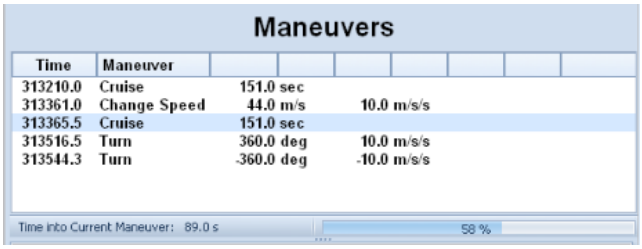
Navigation Output Data, often referred to as TSPI [Time-Space-Position-Information ] is computed real-time from two sources; TRUTH, derived from the Tapestry Algorithms, and COMPUTED captured from the Reference Receiver.




The Ground Track display is very useful as the True and Computed Position are displayed simultaneously providing an excellent visual feedback.

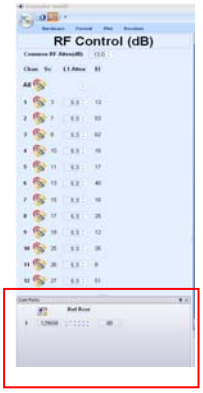
The Reference Receiver data is saved byte-wise in the scenario folder within the file **RECEIVER.DAT**. Data translated into ASCII is saved in **REFERENCE.DAT** within the Scenario folder.

Associated with the ground track display is the Maneuver Segments list shown in the top-right-hand corner of the main screen.

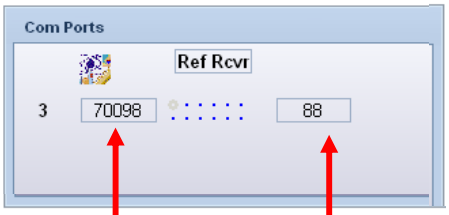



If using either a remote file import, or real-time generation mode, the maneuver list will contain only the simulation start time and the maneuver listed as unknown/ real-time / or Route.

## REFERENCE RECEIVER DISPLAY

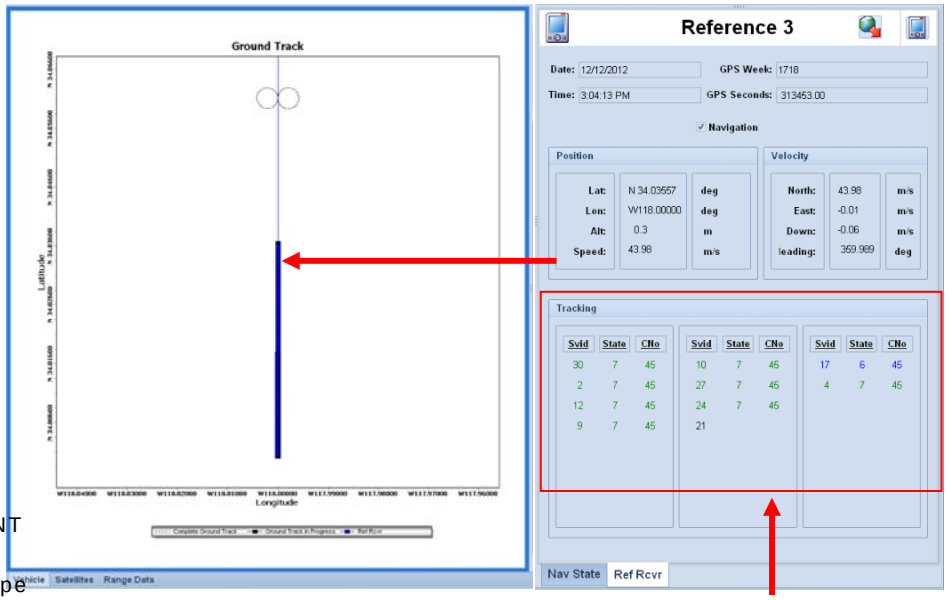



COMPUTED TSPI data is available from the NAVLABS REFERENCE RECEIVER mounted within the LABPRO Chassis. By construction, the Reference Receiver is attached to COM3 as a dedicated port. *Real-Time*, Run Scenario will compute the time synchronized difference between the true position and velocity data with the corresponding computed data from the Reference Receiver. This data is displayed in a locally level tangent frame (North, East, Vertical) and logged to the hard disk in two variants within the scenario folder.

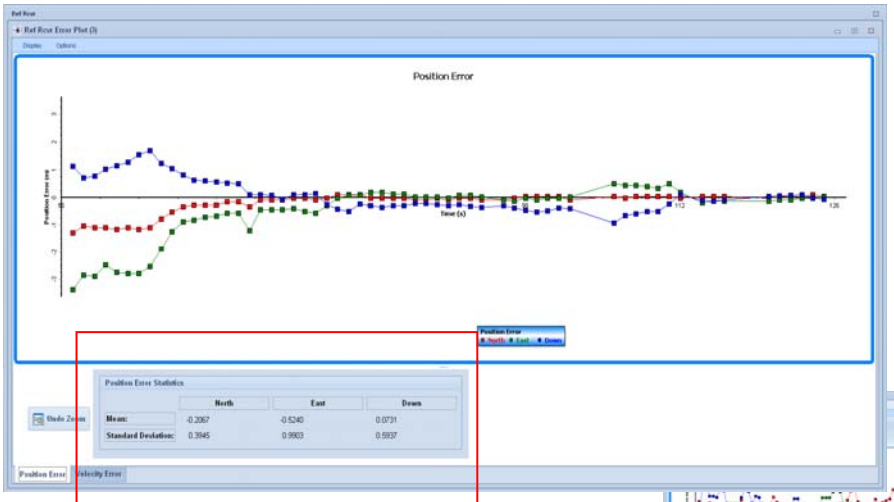


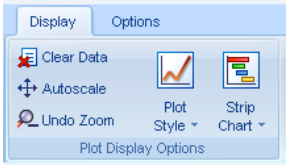

INCOMING BYTE COUNT FROM REFERENCE RECEIVER. This must accumulate or rcvr is OFF.

OUTGOING BYTE COUNT FROM TAPESTRY. Depending upon rcvr type count might be 0




CHANNELIZED Tracked SVID, Signal Power, Track Status.




TRUE-MINUS-COMPUTED POSITION AND VELOCITY DATA IN LOCALLY LEVEL TANGENT FRAME

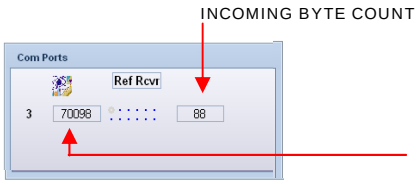
RUNNING STATISTICS

DETAILS OF THIS IMPORTANT TAPESTRY COMPONENT FOUND HERE
Using the NAVLABS Reference Receiver [PDF]

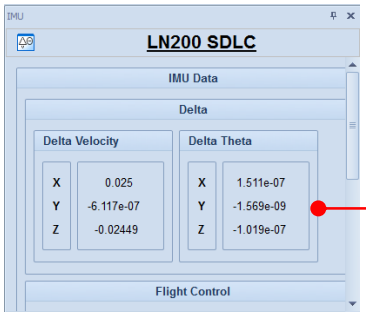
## OUTPUT DATA PANELS: AUXILIARY SENSOR DISPLAY

The display in the lower-left-hand corner of the Main Form is used to display the outgoing and incoming data associated with any auxiliary I/O devices such as the serial ports or the optional NAVLABS Multi-function I/O Inertial and Automotive output expansion cards.

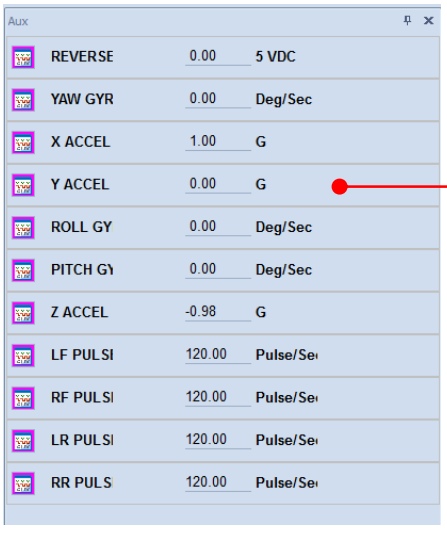
This data is updated at approximately 1 Hz. It is useful for as a run-time diagnostic and monitoring tool and to make sure "*data is being output*".



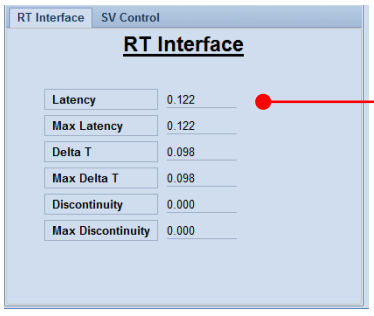

CUMULATIVE INCOMING BYTE COUNT OF SERIAL DATA [REFERENCE RECEIVER]




INERTIAL MEASUREMENT
ΔVELOCITY ΔANGLE
NAVIGATION AND FLIGHT CONTROL



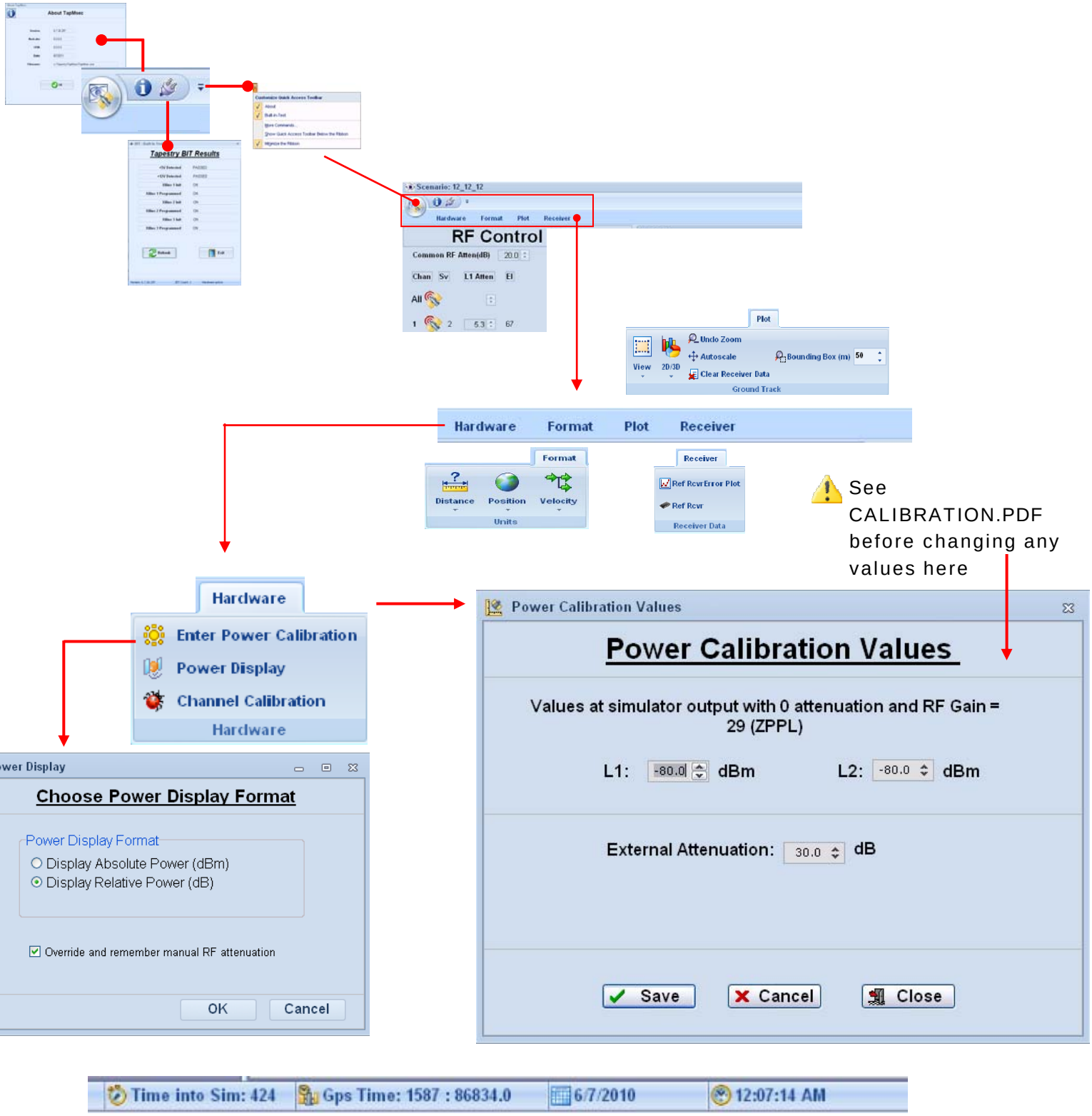

AUTOMOTIVE DATA
FOUR (4) WHEEL-PULSE
3 AXIS GYRO, 3 AXIS ACCELEROMETERS
REVERSE
RATE TABLE




REAL-TIME DISPLAY
CLOSED LOOP / OPEN LOOP


REAL-TIME SV ASSIGNMENT

## MENUS & PULL DOWNS







The status bar contains continual updates of the current simulation time in three formats; (a) seconds into simulation, (b) GPS week and seconds into week, and (c) date and time of day.

If the time is not incrementing on the status bar, *this is an error- run BIT.*