

Application Note

## **Recording and Playing Trajectory Routes in the GPSG-1000**

Trajectory files recorded by GPS receivers or the GPSG-1000 and saved in the .gdt or .nme format may be played back in the GPSG-1000 for simulation and testing of GPS receivers. This Application Note will detail the steps required to record a Trajectory route in the GPSG-1000 GPS RX and playback the file for simulation.

The GPSG-1000 GPS RX will record its position and route. Attach the included GPS RX antenna. From the Main Menu, select the down arrow. See Figure 1.



Figure 1. Main Menu

## Acquisition

From the lower portion of the Main Menu, select GPS RX. See Figure 2.





Figure 2. Main Menu, Lower Section

The GPS RX page will display the current GPS position fix and the visible satellite. See Figure 3.

GPS Receiver Altitude Speed Latitude Internal 0 ft 0.0 Mph 0° 0' 0.0000" N Current Date/Time Position Fix Longitude 18-Aug-2015 15:16:53 No position fix 0° 0' 0.0000" E Status Almanac Status Active Satellite Shift Not loaded Load Almanac GPSRx Reset Record Trajectory GPS RX	Current Position	
18-Aug-2015 15:16:53       No position fix       0° 0' 0.0000" E         Status       Almanac Status       Active Satellite       SNR         Not loaded       Imanac       GPSRx Reset       GPSRx Reset       GPSRx Reset         Recording       Record Trajectory       Imanac       GPSRx Reset       Imanac       Imanac		
Almanac Status     Active Satellite     SNR       Not loaded		
Not loaded Load Almanac GPSRx Reset Recording Record Trajectory	Status	
Load Almanac GPSRx Reset Recording Record Trajectory	Almanac Status	Active Satellite SNR
Record Trajectory	Not loaded	
	Load Almanac GPSRx Reset	
GPS RX	Record Trajectory	
	GPS RX	

Figure 3. GPS RX Page

Wait for the GPS RX to acquire a 3d position fix. See Figure 4.

Current Position		
GPS Receiver Altitude Speed Internal 943 ft 0.5		ititude 3° 56' 28.1062" N
Current Date/Time Positie 18-Aug-2015 18:06:21 3D set		ongitude 4° 45' 16.2112" W
Status		
Almanac Status	Active Satellite	SNR
Almanac Load Complete	6	37
	2	34
Load Almanac GPSRx Reset	30	
	28	33
Recording Record Trajectory		
GPS RX		

Figure 4. GPS R Page with 3D Fix

## Record

Press the Record Trajectory button to start recording. The GPSG 1000 will continue to record until the Stop Recording button is pressed. Note the Current Date/ Time field, the time is displayed as GMT. See Figure 5

Current Position		
GPS Receiver Altitude Speed		
Internal 1016 ft 0.7	Mph 38° !	56' 27.1158" N
Current Date/Time Position	n Fix Longi	tude
18-Aug-2015 18:07:40 3D so	lution 94° 4	45' 15.8706" W
Status		
Almanac Status	Active Satellite	SNR
Almanac Load Complete		34
		38
Load Almanac GPSRx Reset	30	32
Locked Locked	28	34
	24	18
Recording     Stop Recording		
GPS RX		

Figure 5. GPS R Page, Recording Trajectory

The data will be stored in a file with the following naming convention: MMDDYYYY\_HHMMSS.mne. The time recorded for the file name is the time the recording is stopped.

## Playback

*Note: Files saved from other GPS receivers may have .nmea file extension. When transferred to the GPSG-*

1000 for playback they must be renamed with .mne file extension. See Application Note: GPSG-1000 File Properties. Once renamed and transferred to the GPSG-1000, they may then played in the same manner as files recorded by the GPSG-1000.

To load the new Trajectory File for playback select File from the Main Menu and then Trajectory from the tabs at the top of the page. Press the Load button and select the new .nme file, press Open. See Figure 6.



Figure 6. File Page, Trajectory File Saved

The new Trajectory file will appear in the Current Trajectory File widow. See Figure 7.

Almanacs	Routes	Settings	Trajectory	KML	Waypoin	
Current Trajecto	ory File: 08	3182015_18	30906.nme		Load	
				(	Manage	
				(	Default	
				(	Clear	
Import From U	SB			Expor	t To USB	
File						

Figure 7. File Page, Trajectory File Loaded

To run the Trajectory File simulation, select Setup from the Main Menu. In the GNSS window in the Simulation field select Trajectory. In the PRN Signal field select Traj File. Set the RF Level in the RF Output window to the desired level. See Figure 8. The Trajectory File records the Signal to Noise Ratio of the received GPS signal. During playback the GPSG-1000 will adjust the RF Power Level to simulate the actual recorded S:N. For this feature to work the simulation must be played back with the same Almanac with which the recording was made. If the Trajectory File is played with a different Almanac the positional simulation will run, but, the Simulation screen will show a "Red" indicator for Traj Power and the RF Level will remain at the set level.

Simulation	Channels I/C	Motion	$\triangleright$
GNSS GNSS GPS Digital Noise Off	Carrier L1 Fading None	SBAS Auto PRN Signal Traj File	Simulation Trajectory Position Source User
Simulation Sta Clock GPSRX	Date	8, 2015	Time 18:14:02
RF Output RF Level -130	RF Port dBm Coupler	Units Imperial Motion Model Unlimited	Lat/Long Format DD°MM'SS.SS"
Setup			

Figure 8. Setup Page, Trajectory Setup

Close the Setup page and select Simulation from the Main Menu. Press Run and the Trajectory Simulation will start. See Figure 9.

GPS Galileo SBAS	$\triangleright$
SV PRN	Visible SVs
1, 2, 3, 6, 17, 24, 28	[7
Carrier Services	
L1 C/A, Pseudo P(Y)	)
PVT	
Sim Date Sim Time Elapsed Speed	Altitude Rate
08/18/2015 18:07:44 00:00:05 2.2	Mph 0 ft/min
Latitude Longitude	Altitude
(38° 56' 27.0222" N 94° 45' 15.8432" W	/ 1024 ft
From To	Distance To Go Heading
	0 ft 166°
RF RELevel	
-130 dBm Traj. Power Ext Ref Runni	ng
Simulation	

Figure 9. Simulation Page, Trajectory File Running

The Simulation will run until the end of the Trajectory File. See Figure 10.

GPS Galileo SBAS	$\triangleright$
SV PRN 1, 2, 3, 6, 17, 24, 28	Visible SVs
Carrier Services	
PVT Sim Date Sim Time Elapsed Speed	Altitude Rate
08/18/2015 18:09:06 00:01:27 1.2 Mph Latitude Longitude	0 ft/min Altitude
Landoue         Longitude           38° 56' 25.8238" N         94° 45' 15.4865" W	1113 ft
From To Distance To	Go Heading ft 104°
RF RF Level -130 dBm Traj. Power Ext Ref Ready Trajectory simulation completed successfully.	
Simulation	

Figure 10. Trajectory Simulation Compelete



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