Subject: **Nav Speed Threshold** function

1. Description:

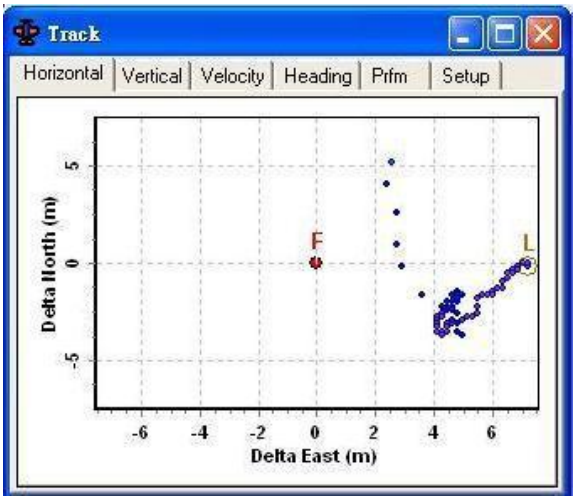
Navigation Speed Threshold is one of the features available to all GlobalTop GPS Modules. It significantly reduces the GPS drifting phenomenon that is typically observed when the GPS receiver is in a static position. It functions basically the same way as its name implies: the GPS engine will process and output the next GPS position only if this next position is moving away from the previous position at a speed faster than 1 m/s (3.7 Km/h). In another word, when the next position is traveling less than 1 m/s, it gets filtered out. This prevents sudden and erratic movement in the otherwise static GPS position.

Just because the GPS module is at a standstill position does not mean that its engine stops processing the GPS signal received. The amount of error in the GPS signal will vary in time, due in part by naturally occurring obstacles such as the RF error inducing ionosphere, or unnaturally in the case of multi-path errors caused by urban landscape. The alteration in the amount of errors will impact the location calculated by the GPS engine.

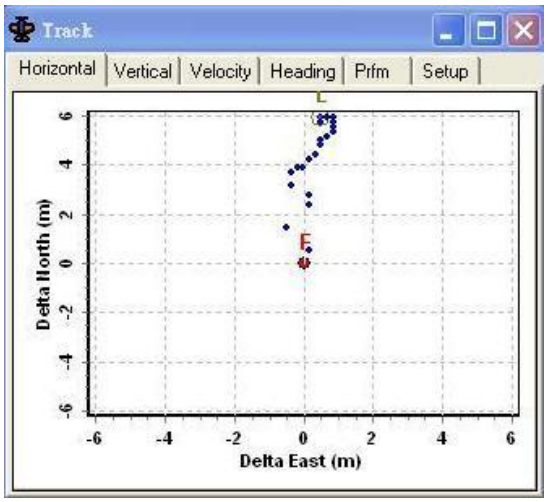
For example: (23.098351, 120284305) and (23.098345, 120284312). These two coordinates in (latitude, longitude) format were outputted from the same GPS module that is in a static position but at different points in time. Even though the two positions only differ by as few as 2 digits, the amount of shift in position observed at the end might differ by up to several meters in distance.

What Navigation Speed Threshold does is that the GPS engine uses “speed” as a parameter to filter out unwanted errors during calculation. If the speed of next calculated GPS position is slower than the specified threshold (1.0 m/s), the output position will stay freezed. The GPS engine will view the calculated position as valid only if the speed is higher than the threshold.

An example of when Navigation Speed Threshold is disabled, notice the drifting phenomenon recorded. The position drifts for up to 7 meters in the East/West direction, and 9 meters in North/South direction.



When Navigation Speed Threshold is enabled, notice that there is a significant reduction in drifting. The drifting for East/West direction is now limited to 2 meters, and 6 meters for the North/South direction.



So why is the value of the threshold set to 1.0 m/s? It is because the average speed of a human walking is around 3.7 ~ 4.5 Km/h, which is roughly close to 1.0m/s. If this threshold is set too high (such as 2.0 m/s = 7.2 Km/h), it is very possible that the output position will remain at fixed position if the user using the GPS module is walking at an average speed lower than the threshold value. The position now gets filtered out by mistake because the speed of the next calculated position is slower than the threshold.