

## IMUCalcs package

The goal of the IMUCalcs package is to expose inconsistencies between the velocity and location values that are computed by the Flight Controller. Velocity values are calculated using a different method than the FC. Comparing the IMUCalcs velocities to the original FC velocities can provide insights into the cause of erratic flight and/or a fly away.

DatCon applies IMUCalcs during the .DAT to .csv conversion. CsvView applies IMUCalcs by modifying the .csv that TXTlogToCSVtool creates

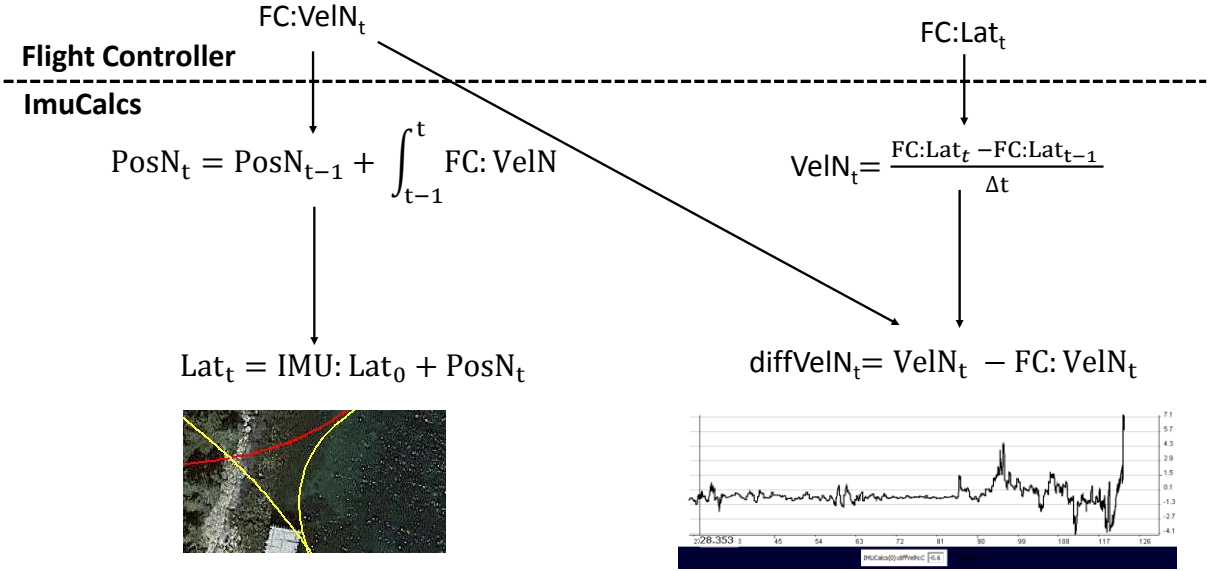
IMUCalcs uses these data

<b>Flight Controller</b>	<b>.DAT</b>	<b>.txt</b>
<b>VelN</b>	IMU_ATT1:VelN	OSD:xSpeed
<b>VelE</b>	IMU_ATT1:VelE	OSD:ySpeed
<b>VelD</b>	IMU_ATT1:VelD	OSD:zSpeed
<b>Latitude</b>	IMU_ATT1:Latitude	OSD:Latitude
<b>Longitude</b>	IMU_ATT1:Longitude	OSD:Longitude
<b>RelativeHeight</b>	IMU_ATT1:relHeight	OSD:height

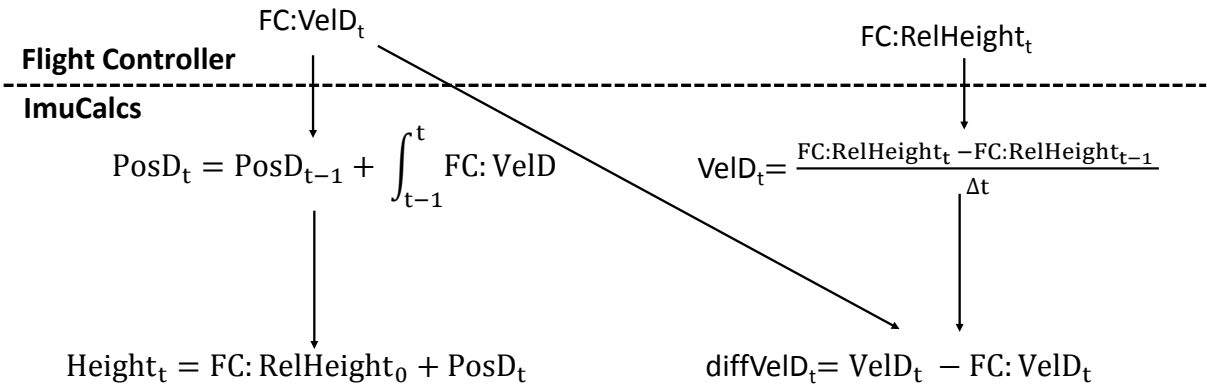
IMUCalcs creates these data

<b>.csv created by DatCon or CsvView</b>	
<b>IMUCalcs:PosN</b>	True north distance from initial position.
<b>IMUCalcs:PosE</b>	True east distance from initial position.
<b>IMUCalcs:PosD</b>	Distance below initial position
<b>IMUCalcs:Height</b>	-IMUCalcs:PosD
<b>IMUCalcs:VelN</b>	True north velocity
<b>IMUCalcs:VelE</b>	True east velocity
<b>IMUCalcs:VelD</b>	Down velocity
<b>IMUCalcs:diffVelN</b>	Difference between FC velN and velN computed by IMUCalcs
<b>IMUCalcs:diffVelE</b>	Difference between FC velE and velE computed by IMUCalcs
<b>IMUCalcs:diffVelD</b>	Difference between FC velD and velD computed by IMUCalcs
<b>IMUCalcs:Long</b>	Longitude
<b>IMUCalcs:Lat</b>	Latitude

Shown below are the latitude/VelN calculations. The longitude/VelE calculations are similar.



Here are the calculations for relHeight/VelD



## Limitations

1. IMUCalcs calculates its velocity data by time differentiating the FC's location data. Better results can be obtained with an inertial solution based on accelerometer, gyro and magnetometer data. This is the method used by sar104 on the mavicpilots.com forum.
2. The IMUCalcs have limited usefulness for the MavicMini and MavicAir2 platforms. These platforms appear to apply more weight to the GPS data when calculating velocity and position. This significantly reduces the likelihood that the FC's velocity and position data will be inconsistent.