GPS Errors

I decided to compare data over the same thirty minute period on two consecutive days in March:

March 3
I set up my equipment on a bench in the Holder quad and collected data between 2115 and 2145. Apart from the cold weather, the process was painless and the data was easily obtained.

March 4
Geostationary satellites, such as the ones that transmit to GPS receivers, orbit the earth once every sidereal day. This had to be taken into account before I could decide when to measure data on the second day of this experiment. The calculation for this was as follows:

1 sidereal day = 23.9344696 hours = 23 hours, 56 minutes and 4 seconds.
Thus, one sidereal day after 2115 on March 3 would be 2111 on March 4.

Results

<table>
<thead>
<tr>
<th></th>
<th>S.D. (NS)</th>
<th>S.D. (EW)</th>
<th>S.D. (Altitude)</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 3</td>
<td>5.560745957</td>
<td>2.416655053</td>
<td>25.92761473</td>
</tr>
<tr>
<td>March 4</td>
<td>5.739383974</td>
<td>2.471052174</td>
<td>18.3987643</td>
</tr>
</tbody>
</table>

My results, as shown on the spreadsheet, revealed low standard deviations for the north-south and east-west distances. However, my values for altitude on both days were considerably more variable. This is probably because I conducted the experiment surrounded by buildings, which served to mask the true altitude at the GPS receiver’s location.