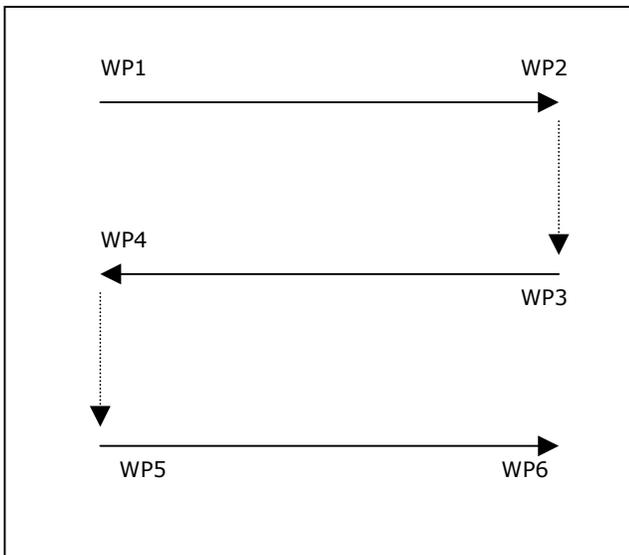


Procedure for Using GPS with Lane Guidance

This procedure describes how to perform a survey based on the following configuration of survey lines, which are generated automatically using the automatic grid survey setup option in GEM's Version 6.0 magnetometers.



Setting Up the Magnetometer

A good starting point for your survey is to set all parameters, including cycle time, tuning, AC filtering, filenames, etc. To do this:

1. Power on the instrument (**B** key)
2. From the main menu, type **A-Survey** and use the navigation keys (**B** and **F**) to move between options.
3. Set the options for your work.

NOTE. It is important when using GPS to set the display mode to **text**. This allows the system to provide you with real-time displays of positions as well as a directional arrow display for navigation.

You should also ensure that tuning, file names and cycle times are set as these are important parameters that control the acquisition and storage of data.

Setting Up GPS Options

1. When all settings are complete, press **1** and **C** together to return to the main menu.
2. Press F-GPS. The system displays the **GPS** screen. When shipped, the system may read **GPS no**.
3. If this is the case, press **C-Change**. The system toggles between **yes** and **no**. Select **yes**.
4. When finished, press **F-ok**. The system displays the **GPS setup** screen. You will use this screen to define your first two waypoints (i.e. assuming that you do not have these already defined).
5. Press D-test. The system displays the **GPS coordinate** screen. The second line shows UTM coordinates and the last line shows lat / long coordinates.
6. With your GPS turned on, check that the "**PPS**" indicator on the first line is flashing to indicate that it is receiving signals. You may also see that the GPS coordinate screen shows "**AD**" on the second line. This means that the

GPS is working in differential mode and locked on satellites. "**AN**" means non-differential mode. "**VN**" indicates that the GPS data is non-valid. In the event of a "**VN**" indicator, you should check that all cables are connected properly and / or try moving the system to improve your GPS reception.

7. Move to the first point on your survey (**WP1**) and write down the GPS coordinates, for example, in UTM.
8. Move to the second point on your survey (i.e. end of first survey line – **WP2**) and write down the GPS coordinates.

Setting Up an Automatic Grid

The version 6.0 system has the ability to define a rectangular gridded area for surveying. To use this capability:

1. Access the GPS-setup screen (i.e. by pressing **1** and **C** from the previous set of instructions, **F- GPS** and **F-ok**).
2. Press **B-navigation**. The system displays the lane guidance & grid setup screen.
3. If this is not set to **yes**, use the **C-change** button to toggle from **no** to **yes**.
4. Press **F-ok**. The system displays the **A-automatic-grid-setup** screen.
5. Press and hold the **A** key. The system displays the lane width screen.

6. If the lane width is not set to the desired tolerance, use the **C-change** button to set the value you want.
7. Press **F-ok**. The system will now run you through a series of setup screens for UTM Easting, etc.
8. Press **C-change** and enter the Easting (i.e. starting) value of your first waypoint (**WP1**).
9. Press **E-enter** and then **F-ok**. Repeat this process for the Northing value.
10. Press **F-ok** for the local x and y grid origins. This option enables you to replace both the display and the output data with "smaller" or "more relevant" values that will guide you more effectively during your survey.
11. Repeat steps 7 through 10 for your second waypoint (**WP2**). When finished, the system displays the **line** setup screen.
12. Press **C-change** and type a line number. When finished, press **E-enter**. The system returns you to the line setup screen.
13. Press **F-ok**. The system updates the line spacing screen.
14. Press **C-change** and type a spacing interval. When finished, press **E-Enter** and **F-ok**. The system requests that you wait. After a moment, you will see the **lane width** setup screen.
15. Press **F-ok**. The system will now scroll you through the waypoints for verification. Press **F – ok** to check

waypoints 1 and 2 and optionally, 3 (just to make sure that waypoints are as expected).

16. When finished, press **E-end** (when it appears on one of the waypoint screens) and **F**. The system returns you to the main menu. You are now ready to perform a survey using GPS, lane guidance and waypoints.

Starting & Performing Your Survey

1. Press **A-survey**. The system displays the **mode** setup screen.
2. Select the appropriate mode, for instance, **E-walkgrad**. The system displays the **survey** screen.
3. Press **A-start** to initiate the survey. The system may ask you to wait while it locates GPS satellites.
4. Walk to your first waypoint (**WP1**). You should notice that the text screen decreases the distance -- indicating that you are getting closer to WP1. A direction arrow is also provided.

Before using the system for the first time, we recommend that you spend some time to become familiar with the use of the arrow. The arrow is plotted every few seconds according to the standard GPS refresh rate of 1 sample per second. You must therefore be moving for this arrow to function.

5. When you have arrived on the station, press **B+**. The system will update the text screen to show the distance to **WP2**.

6. Press **F – start survey**. The system may briefly display a **wait for PPS** or similar message as it enables the RF and seeks satellites.
7. Press **C-walk** and start walking immediately. The system arrow should start to point you in the correct direction. The time for the arrow to first update itself is three seconds, so you have to walk straight initially until the system arrow is configured for use.
8. When you reach **WP2**, press **A** (not marked on screen) to stop cycling. The system displays the **E - next waypoint** screen.
9. Press **E-next waypoint** and use the guiding system to direct you to the next waypoint (**WP3**).
10. When you reach **WP3**, press **B+**. The system indicates the distance to **WP4**.
11. Press **F-start survey**. The system displays the survey setup screen.
12. Press **F-ok** followed by **C-walk** after 2 seconds. You are now ready to walk and collect your second line of data (i.e. between **WP4** and **WP5**).
13. Repeat steps 4 to 11 until your survey is complete.

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