# How to Use StarPilot Sight Analyzer

As of August 19, 2000, we have added an all new unique Sight Analyzer function to the StarPilot. To learn about the theory behind this process, please read our article on How to Average Sextant Sights, a pdf file online at www.starpath.com in the celestial Resources section (http://www.starpath.com/online/celestial/sight_average.pdf).

The goal is to effectively average a series of sights to determine which one is a proper representative of the full set. To do this, we compute the theoretical value of Hc over the time interval of the sights and then compare the slope or curve of these data with the actual sights. This process shows which sights are outside of statistical fluctuation (so they can be deleted or not considered) and lets you choose the best of the set. Please read the article above for the details.

To execute Sight Analyzer in StarPilot, enter a set of sights over a reasonable short time period (10 to 20 minutes or so) using the normal Sight Reduction function. If the Hs values change too much during your sight period (time is too long), then the Hs scale on the calculator display is too compressed and differences do not show up well. Once the sights are stored, set DR mode to Speed, DR time to the time of the first sight and enter the correct DR position for that time along with your course and speed made good over the sight period. Then from the Celestial Fix menu, select Sight Analyzer (#3). The plot on the right shows 7 sunlines, but the first one was so much earlier that we will delete it and plot again, as shown below.
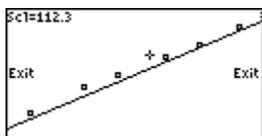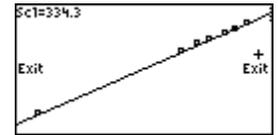
The program will then compute the Hc value (actually a computed Hs, since we undo all the corrections that have been applied to the sight at that time), then store this theoretical value, and then proceed on down your sight list, advancing the DR to the time of the next sight, computing Hc, and storing it, until all are done. Next the curve of theoretical sight values is drawn as a graph and your actual sights are plotted on the graph. Any sights that are far from the plot are most likely wrong.
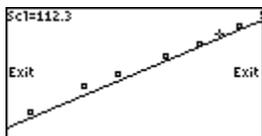
To best compare the data, move the curve by placing the cursor at the place you want the curve to cross and press Enter, and this way find the best fit to the data. Note the cursor cannot be right on a data point, since Enter then will report back the difference between line and data. Find a location off of a data point that will place the curve (line) such that there are about the same number of points above as below the line, but disregard any that are clearly far off the line. Then choose any one sight that is on the line as your best. That one sight will be as good for a fix (or better) than all the sights plotted together.
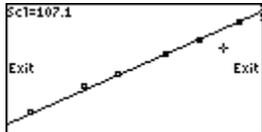
This process can also be applied to any sights including those around LAN, which might help with a "reduction to the meridian" analysis.

To Exit the Analyzer, place the cursor on the word "Exit" and press Enter.

This tool is best suited for poor or sparse data. The above sights have little spread, except we can see that the 2nd and 3rd are not as good as the others. A best average would throw those two out. In other words, the last 3 and the first give enough confidence on the slope that we can indeed conclude that the 2nd and 3rd are too high. If we did not know the slope, we would have likely called the first one off and tilted the line, effectively choosing a value which was slightly too high. We will put more examples online as soon as we can. We have just found a log book from a 1982 Pacific crossing using only celestial, so there is a wealth of data there to be analyzed again using the StarPilot. A sample of analyzing a set of LAN sights is shown on the next page. We need to find some data from poor conditions to really illustrate the power of this function.

Remember that the Sight Analyzer analyzes all stored sights, so you must limit stored sights to a specific, rather short sequence of sights of the same body to take advantage of this feature. The most efficient procedure would be to enter sights in these short sets, analyze them, then take just one of the set to represent the lot and write down Hs and WT for it, then delete it and enter the next set and again select the best single sight for that group, then delete the rest and re-enter the first to make a running fix.

Alternatively, you could enter all sights, then store them in a PC with the GraphLink program. We will explain this in more detail elsewhere. It is a quick and easy process to transfer all sights and related data to a PC and then later move them back into the calculator. See Storing sight Data in a PC.

Using TI-Graph Link to Capture Screens

Here is an example of capturing plots from the Sight Analyzer for printing or storing. The example is a set of high LAN sights, peaking out at about 87°, from July, 1982 in the Tropics, but that is not the point of this note.

Procedure:
(1) Connect StarPilot to your PC with Link cable and start TI-Graph Link program with TI-86 turned on.

(2) Set up StarPilot to show on the screen what you want to capture. Below is from the Sight Analyzer after entering 15 sunlines spanning LAN. (Later we explain how to store this sight data in your PC after sight reduction, and how to move it back to the StarPilot for further analysis or display)

(3) Under the Link menu, select Get Screen, to see the window shown below. Click Get Screen.

(4) After it shows the screen, click Clipboard and that copies the image to your Windows clipboard. You can also choose to have the clipboard image be larger or smaller than shown.

(5) Then paste the image into your favorite graphics program or even a page in MS Word, or an e-mail document. Here we just pasted the bottom 3 pictures into this document.


Sight Analyzer Discussion

the first capture is all 15 sights, and the analyzed results are not very interesting since the scale is too big. But suppose we only got the few sights shown in the picture below it. Then run the analyzer, then set the cursor where you want the line redrawn and press Enter. Notice then that the analysis shows that even with just these few sights, we have a good LAN, and that the next to last sight was too low.

The pictures are still small but the scale is better.

Notice the difference between solid dots and hollow ones. Solid means the theory goes through the point and hollow means it misses it.

The sight analyzer always analyzes all sights stored, so you may have to delete some to get the best picture, which makes moving sights from calculator to PC and back a very useful operation. It is discussed in the note on Storing Sight Data in a PC.
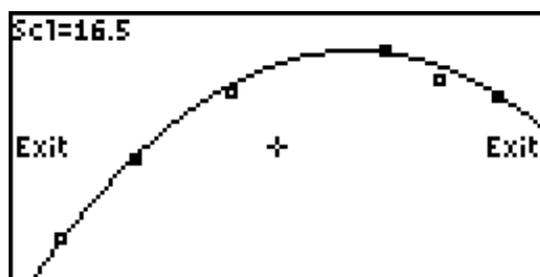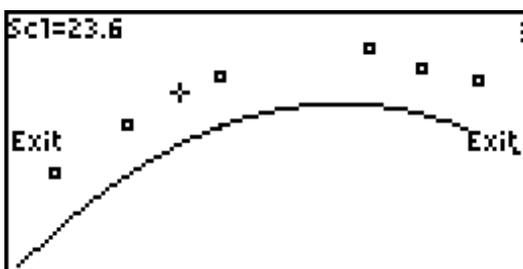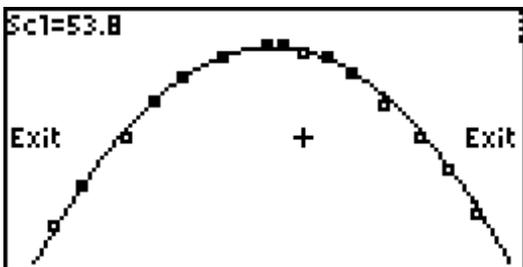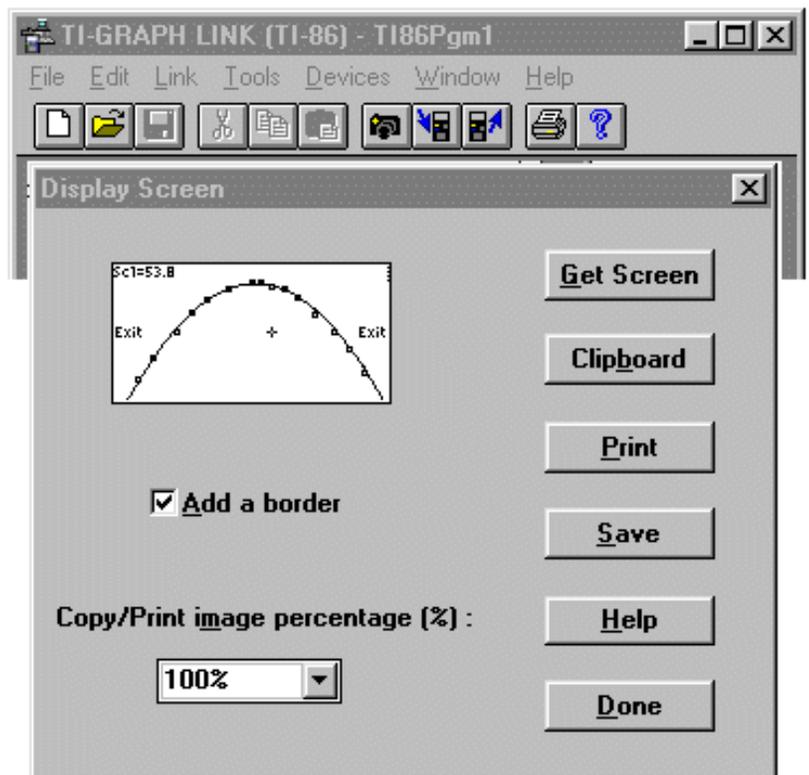
This is only one example, as time goes by we will try to find more from our past logbooks and write them up as examples.