Tech Notes

LT-1000 NRU Configuration of Adaptive Calibration

This tech notes describes how to configure a LT-1000 NRU for Adaptive calibration mode. It is expected that the LT-1000 NRU is installed and fasten as described in the LT-1000 User & Installation Manual. In order to configure the LT-1000 NRU to the Adaptive calibration mode, the LT-Service Tool is required. The LT-1000 NRU is from factory configured to Standard calibration mode, which is the Figure 8-pattern calibration. The LT-1000 NRU will output a 5 degrees heading resolution, until deviation calibration has been performed.

Required Documentation

95-100178 LT-1000 User & Installation Manual Rev. 1.00

Please note; rev. 1.00 does not include information about the Adaptive calibration mode.

Required Hardware

Personal Computer or Laptop (Windows), USB to Serial Adapter (RS-422)

Required Minimum Software Version

LT-1000 NRU: v1.02 or newer

LT-Service Tool: v1.05

Instructions

1) Connect the PC to the LT-1000 NRU as described in the LT-1000 User & Installation Manual, see *Connecting LT-Service Tool* on page 25.

2) Start the LT-Service Tool by double-click on the file: LT-Service_v1.05.exe. You will now see the following picture:

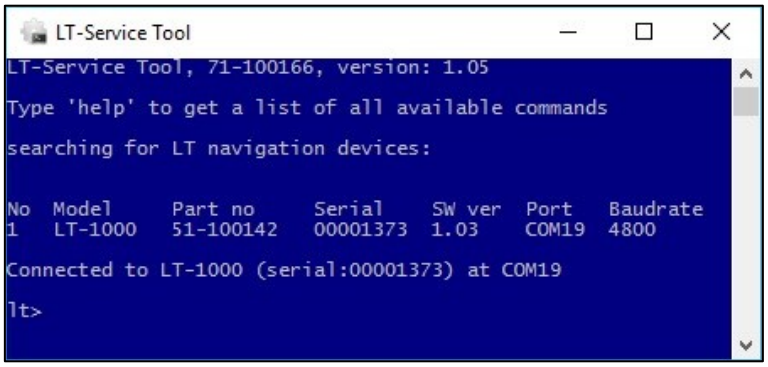

Figure 1: LT-Service Tool v1.05 connected to a LT-1000 NRU with 4800 baud.

3) If you type 'help' in the command shell you will get a complete list of available commands in the LT-Service Tool. To get detailed information for the specific command, type 'help' in front of the command (e.g. lt>help attitude filter).

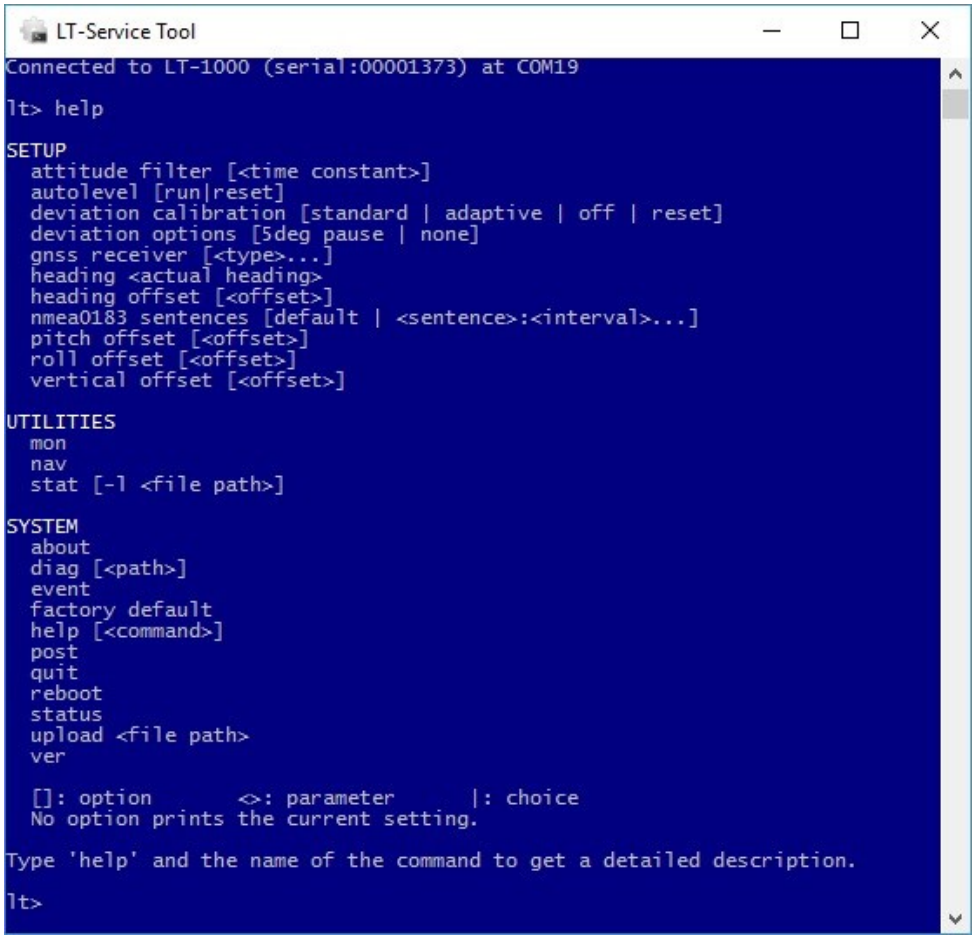

Figure 2: Illustration of the 'help' command.

4) For the best possible deviation calibration results, the roll and pitch mounting offset must be made known to the LT-1000 NRU. After the LT-1000 NRU has been fasten, execute the following command:

   lt>autolevel run

   Use the 'nav' command to verify that the LT-1000 NRU has been levelled to zero (roll/pitch) for optimal performance. Below two pictures are illustrating the effect of the 'autolevel' function.

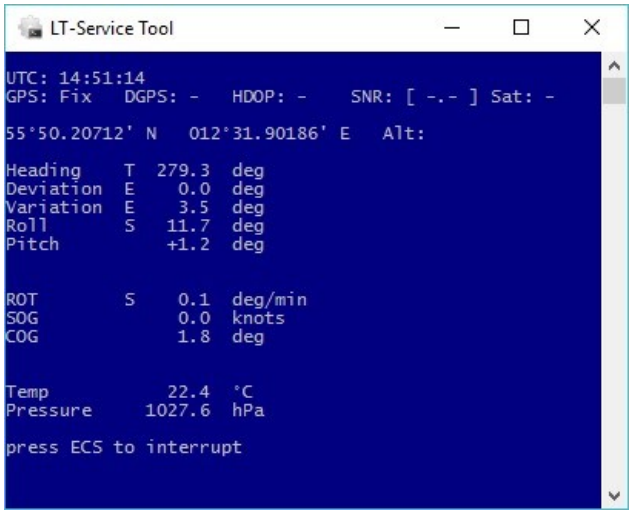

Figure 4: Before applying the 'autolevel' function.

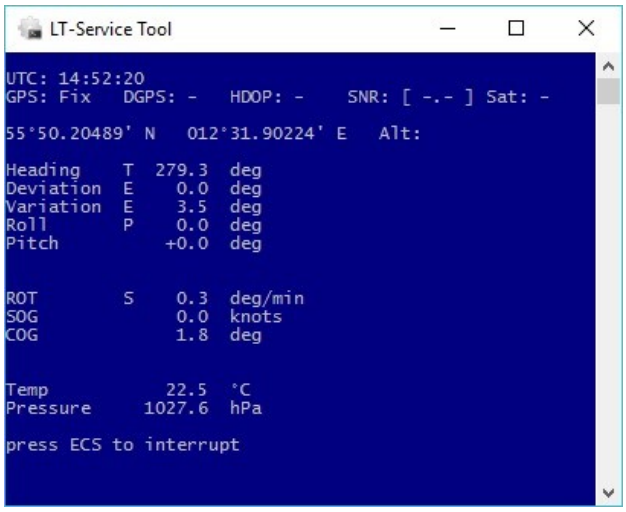

Figure 3: After applying the 'autolevel' function.

5) The 'status' command can be used to check the current configuration of the LT-1000 NRU, including the compensated offsets values from the 'autolevel' function.

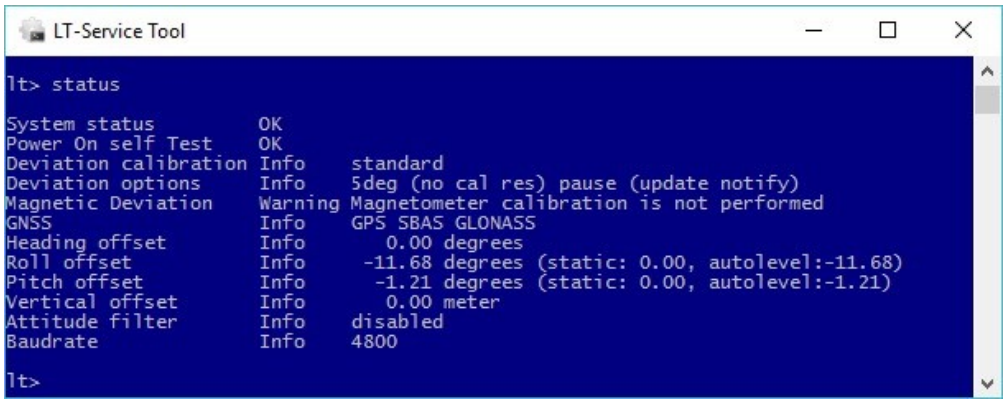

Figure 5: Roll and pitch offset values calculated by the 'autolevel' function.

6) The calibration mode is set to Adaptive with the following command (remember reboot):

   lt>deviation calibration adaptive

   and

   lt>reboot

   Type the following command to verify correct read-back of the Adaptive configuration mode:

   lt>status

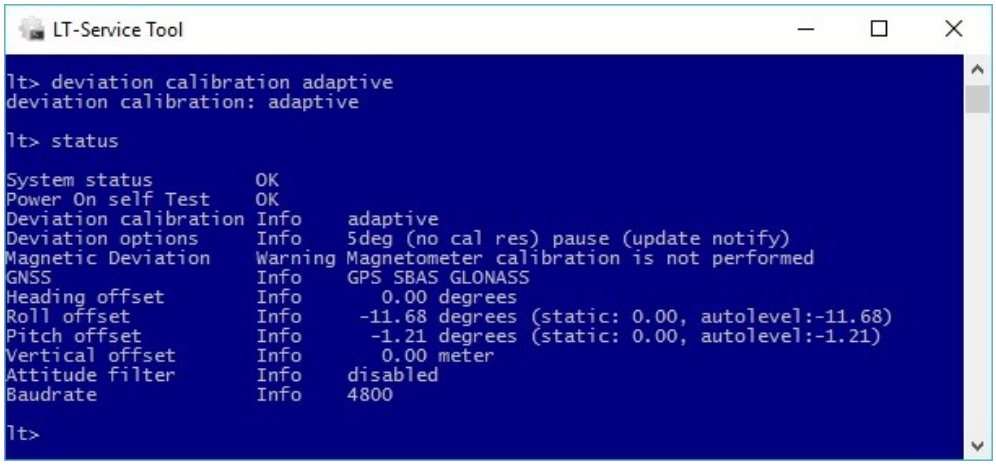

Figure 6: Configuration of the 'Adaptive' deviation calibration mode

7) When in Adaptive calibration mode, data is only collected if the ship has maintained a speed of minimum 3 KTS for the last 0.5 NM.

   If the speed drops below 3 KTS, data collection is paused until the vessel has maintained a speed of minimum 3 KTS for the last 0.5 NM.

NOTE: *The LT-1000 NRU will output heading data with a resolution of 5 degrees until the LT-1000 NRU has collected enough data points to calculate the first deviation. Hereafter, the heading data resolution will be 0.1 degrees.*

NOTE: *An initial Adaptive deviation calibration can be forced by completing a 360° circle at low speed (3 to 20 KTS) and low rate-of-turn (< 2°/s).*

The Adaptive deviation calibration algorithm will continuously collect data and improve the deviation calibration. The user will not be affected/noticed by an update to the deviation calibration in Adaptive calibration mode.

IMPORTANT: If the LT-1000 NRU is physically moved or rotated, it is required to perform a new autolevel and deviation calibration. If configured to Adaptive mode, the deviation calibration should first be reset. Repert step 4 to step 8.

8) The LT-1000 NRU will output full heading resolution, 0.1 degrees, after the first successful deviation calibration has been calculated. Check the chart-plotter, multifunction display, autopilot or other instrument for successful calibration.

Alternatively, connect the LT-Service Tool to check for a successful Adaptive deviation calibration. The 'Status' command can be used for this verification:

lt>status

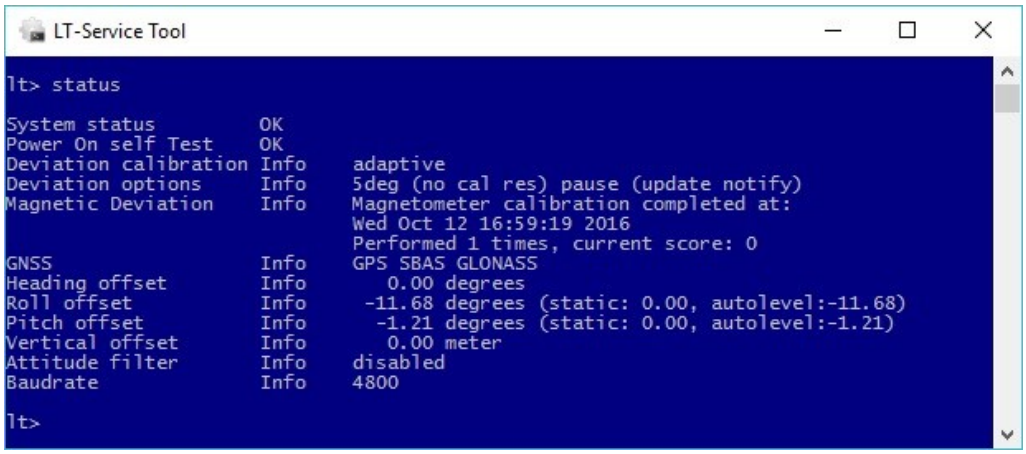

Figure 7: Verify a successful Adaptive deviation calibration.

Info: Magnetometer calibration completed at: Wed Oct 12 16:59:19 2016

Performed 1 times, current score: X

9) It is possible to disable the Adaptive deviation calibration mode, if subsequent deviation calibration updates are unwanted. Use the following command to disable the deviation calibration (remember reboot):

   lt>deviation calibration off

   and

   lt>reboot

10) If the LT-1000 NRU is misaligned with respect to the bow, it is possible to insert a heading offset. The heading offset can be adjusted any time, without affecting the calculated deviation calibration.

    lt>heading <actual heading>

Additional configuration options are available, but will not be described in details in this tech notes. Please contact your local distributor or dealer before making contact to Lars Thrane A/S.