



# **MARITIME UNIVERSITY IN SZCZECIN**

## **ORGANIZATIONAL UNIT:**

FACULTY OF NAVIGATION - DEPARTMENT OF NAVIGATION DEVICES

## **Instruction**

### **PRINCIPLE OF OPERATION AND HANDLING OF THE NAVIGATION ECHOSOUNDER**

#### **(Echosonda GPSMAP 235 SOUNDER)**

#### **Lab**

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## Purpose of the exercise

The purpose of this exercise is to understand the operation of the navigation sonar and how to use the device during navigating. Familiarization with the construction of the navigation sonar: GPSMAP 235 Sounder firmy Garmin and the adjustment and placement of controls available to the operator.

## Preliminary information, knowledge test and report.

**For a third class, a brief knowledge check will take plac.**

**Scope of preparation: the issues are in the introductory part, the theory of literature on the next page.**

Report writing on your computer will not be accepted

The reports are written individually!

The report consists of 2 parts:

- Part A - Preliminary
- Part B - Exercise course (see details below) and additionally:

Measurement Cards: signed by the teacher; own conclusions

\*) On the measurement card (exercise diary) the actions are recorded - then they are rewritten purely in the report.

\*\*) Reports of repeated applications from other students will be rejected !!!

**Part A** - In the **introductory part** shall be included:

- Purpose of the exercise;
- Tables with IMO, PRS, and PKN required for the sonar;
- Basic specifications: GPSMAP 235 Sounder by Garmin;
- Description of the measuring system: GPSMAP 235 Sounder firmy Garmin;
- Measuring board for 30 measurements;

**Part B** **preparation of report** (course of the exercise) describing its individual stages:

- Describe all activities performed on the exercise;
- Answer all questions from the exercise;
- Own conclusions;

(!) Be sure to include a complete measurement card signed by the instructor

(!) At the end, write the conclusions - an individual report of the exercise.

Conclusion should include: own comments on: device operation, interface comfort, presentation of data, etc.

*No requests - report rejected*  
*Conclusions borrowed - report rejected;*

Complete reports must be submitted to the next class - to the teacher, from which classes were held.

**The exercises include:**

1. Presence in the class;
2. Pass the test;
3. All reports must be positively approved

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**Literatura:**

**„Urządzenia Nawigacji Technicznej”,** Autorzy: M. Gucma, J. Montewka, A. Zieziula.  
wyd. Fundacja AM Szczecin, 2005

## Description of the measuring system

The Garmin GPSMAP 235 Sounder is a multifunction navigational aid that works on waterways around the world. It was designed to keep accurate electronic navigation, the use of electronic maps and probing depth.

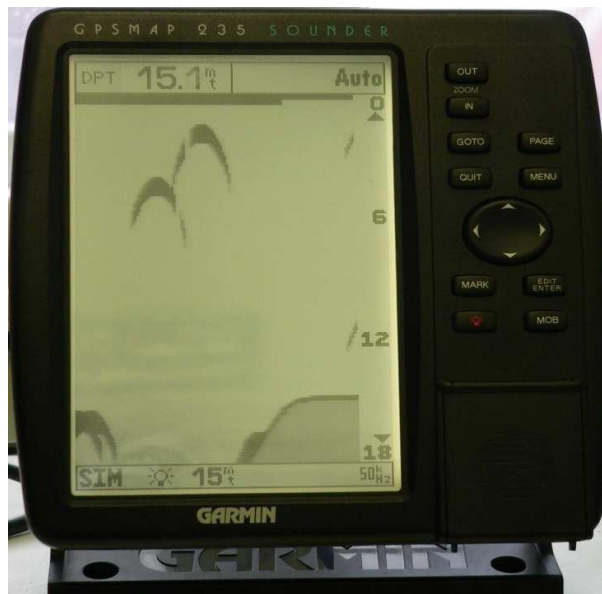



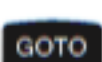




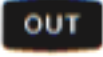




Fig. 1. GPSMAP 235 Sounder

	Turns the unit on and off and controls 3-level screen backlighting.
	Scrolls the main pages in sequence and returns display from a submenu page to a main page.
	Captures your present position and displays the mark position window.
	Displays the GOTO waypoint window, allowing you to select the destination waypoint. Press GOTO twice to select a destination waypoint from the map.
	Displays context-sensitive options window. Press MENU twice to display main menu page.
	Activates highlighted fields and confirms menu options and data entry.











	Returns display to a previous page or restores a data field's previous value.
	Decreases the scale of the moving map and highway pages.
	Increases the scale of the moving map and highway pages.
	Controls the movement of the cursor and is used to select options and positions, and to enter data.
	Marks your present GPS position and instantly sets a return course while providing steering guidance.


#### TECHNICAL PARAMETERS:




- High contrast 7 " LCD display.
- 12 channel GPS receiver (tracking and using up to 12 satellites simultaneously) for very accurate positioning.
- Ready to work in differential mode, just plug in the differential correction receiver to get an accuracy of better than 5 meters.
- Possibility to store 250 waypoints with comment and icon assigned.
- Possibility to use built-in global database, scale from 4096 to 64Nm.
- Ability to create and store 20 reversible routes, with up to 30 points each.
- Electronic G-chart<sup>TM</sup> device for graphing.
- Ability to convert LORAN coordinates to latitude and longitude coordinates.
- Four-step Zoom.
- Ability to create underwater waypoints.
- Operation of the receiver at two frequencies to ensure maximum coverage of the area and good detail.
- Highly efficient noise reduction system for fault-free measurements.

## Exercise course


Time for exercise: 90min

1. Turn on and adjust the base of the receiver.
2. Press and hold the key , until you hear a beep and a welcome page appears with the name of the receiver. When the warning appears, confirm with the key .
3. Adjust the contrast and backlight if needed. To increase or decrease the contrast press  Left or right arrow and confirm with the setting .
4. To adjust the backlight briefly press the key , there are 4 backlight settings (off, 1, 2, 3).
5. Press  and view message about searching satellite signal. (SEARCHING THE SKY), then with the key  go back to the previous screen.
6. Prepare the sonar for work.
  - 6.1. Go to (MAIN MENU), to do this, press the key twice .
  - 6.2. Press  select the navigation settings option (NAVIGATION SETUP) and confirm .
  - 6.3. Set the following parameters:
    - POSITION FORMAT - hddd°mm.mmm' .
    - NAVIGATION UNITS – Nautical (nm, kt, ft).
    - DEPTH UNIT – Meters.
    - TEMP UNIT – °C.
    - Leave the rest of the parameters unchanged.

To change individual parameters, press the key  select the appropriate box,

press , then press  choose the appropriate option from the list, and finally confirm by pressing .

6.4. Save and then expand the shortcuts of units where information (navigation units, depths, and temperatures) can be provided.

6.5. By double pressing  Go back to the space segment screen. See fig 2.

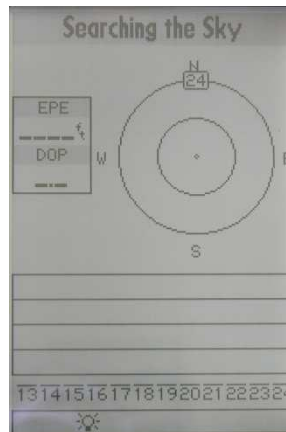






Fig. 2. Space segment screen

6.6. Turning and setting of the simulation parameters. Turn simulation on. In this case press , then press  select option (START SIMULATOR?), confirm by pressing , confirm the warning button .








6.7. Set simulated depth to 15m. To do this, press , select (SETUP SIMULATOR?), and confirm . When the simulation settings window appears (see Figure 3



Fig. 3. Display the simulation settings window

Select  (DEPTH) option, and confirm your choose by pressing . Then, using the key  set the 15m depth (DEPTH), confirm by pressing . Press  to exit the menu.



7. Go to the sonar screen (Figure 4). Between the screens you can pass by pressing





Fig. 4. The screen sonar

8. Restore default settings. To do this, press , then press  choose (RESTORE DEFAULTS?) and confirm by pressing .

9. Adjusting the depth range. Change the depth range selection from automatic to manual.




For this purpose press  up and down. After selecting the appropriate range, confirm with the key .

9.1 Return to automatic mode. To do this, press up or down and hold . After setting the mode dial to automatic depth range and confirm using .


9.2 Make a note of where on the screen and how the depth range and mode are displayed.

10 Zoom function.

10.1 Press , redraw the screen and describe the information that appears on it

10.2 Press  again, make a note of your changes. Press  check and note possible zoom values. Press the zoom out key (return to the initial screen) .

11 Gain settings (SENSITIVITY).

11.1 Set the gain to 100%. To do this, press .





Select the gain setting option (SENSITIVITY ADJUST?), confirm by pressing



. Gain value, which appeared in the upper right corner, set to 100%.

11.2 Changing the gain in the range of 5% to 100% examine and note the effect on the presented value.

11.3 Redraw echograms for settings 5%, 50% and 100%.

11.4 Set gain value to 100% and confirm



12. Chart Speed setting of the echogram.

12.1 Change the speed of the echogram. To do this, press



by



Select the option to set the speed of the echogram (CHART SPEED

ADJUST?), confirm



, then using the key



Change the speed of the echogram from minimum to maximum.

12.2 Explain what is the meaning of this setting.

13. Sonar settings.

13.1 Change the frequency setting of the sonar at 50/200 kHz. For this purpose press



, next press



select the sonar settings (SOUNDER SETUP?), and confirm



. Use



select the frequency (FREQUENCY), and confirm



. From the list



select 50/200 kHz and confirm



. Exit the menu with the key



13.2 Redraw the screen, note what changes occurred.

13.3 In the same way, set the operating frequency sonar 50 kHz.

14. Calculation of average depth value.

14.1 For 5 minutes, note the depth readings every 10 seconds.

Measurement number	Time [s]	Depth [m]
1	00	14.3
2	10	13.2
...	..	..
30	290	15.6

14.2 Calculate the average depth value.

15. Press



to switch off.

