



MARITIME UNIVERSITY OF SZCZECIN

Institute of Marine Traffic Engineering

Exercises no. 1

Procedure for starting and adjusting basic navigation systems receivers

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Valid from: 2018	

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20.	Przedmiot:	N/TM2012/12/20/UN2						
URZĄDZENIA NAWIGACYJNE – moduł 2								
Semestr	Liczba tygodni w semestrze	Liczba godzin w tygodniu			Liczba godzin w semestrze			ECTS
		A	C	L	A	C	L	
I	15	2	1	1	30	15	15	2
II	15	1		2	15		30	2
III	15	1		1	15		15	2
IV	15	1		1	15		15	3
V	15	1		1	15		15	2

III/2. Efekty kształcenia i szczegółowe treści kształcenia

Efekty kształcenia – semestr II		Kierunkowe
EK1	Ma wiedzę oraz umiejętności w zakresie wykorzystania, obsługi i konfiguracji odbiorników systemów nawigacyjnych do planowania oraz realizacji podróży morskiej. Zna ograniczenia i dokładności systemów nawigacyjnych.	K_W15; K_U12; K_U18; K_U26
EK2	Ma wiedzę w zakresie: właściwości i propagacji fal elektromagnetycznych, parametrów fal radiowych, wzorców i skali czasu, układów odniesienia oraz zjawisk wpływających na ruch satelity w Ziemijskim polu grawitacyjnym. Zna budowę i zasadę działania poszczególnych systemów nawigacyjnych.	K_W06; K_W13; K_W24
EK3	Potrafi pozyskiwać informacje z literatury, baz danych oraz innych źródeł, integrować je, dokonywać ich interpretacji oraz wyciągać wnioski i formułować opinie dotyczące efektywnego wykorzystania systemów nawigacyjnych w praktyce.	K_U01

Metody i kryteria oceny				
EK1	Ma podstawową wiedzę oraz umiejętności w zakresie wykorzystania, obsługi i konfiguracji odbiorników systemów nawigacyjnych do planowania oraz realizacji podróży morskiej. Zna ograniczenia i dokładności systemów nawigacyjnych.			
Metody oceny	Sprawdziany i prace kontrolne w semestrze, zaliczenie laboratoriów.			
Kryteria/ Ocena	2	3	3,5 - 4	4,5 - 5
Kryterium 1 Wykorzystanie odbiorników systemów nawigacyjnych.	Nie potrafi korzystać z odbiorników systemów nawigacyjnych.	Potrafi korzystać z odbiorników systemów nawigacyjnych w stopniu podstawowym.	Potrafi korzystać z odbiorników systemów nawigacyjnych w stopniu zaawansowanym.	Potrafi w pełni wykorzystać możliwości odbiorników systemów nawigacyjnych.
Kryterium 2 Obsługa i konfiguracja odbiorników systemów nawigacyjnych.	Nie potrafi obsługiwać i konfigurować odbiorników systemów nawigacyjnych.	Potrafi obsługiwać i konfigurować odbiorniki systemów nawigacyjnych w stopniu podstawowym.	Potrafi obsługiwać i konfigurować odbiorniki systemów nawigacyjnych w stopniu zaawansowanym.	Potrafi w pełnym zakresie obsługiwać i konfigurować odbiorniki systemów nawigacyjnych.
Kryterium 3 Posiada wiedzę w zakresie standardów, dokładności i ograniczeń systemów nawigacyjnych.	Nie posiada wiedzy w zakresie standardów, dokładności i ograniczeń systemów nawigacyjnych.	Posiada wiedzę w zakresie standardów, i dokładności systemów nawigacyjnych.	Posiada wiedzę w zakresie ograniczeń systemów nawigacyjnych.	Posiada wiedzę w zakresie standardów, dokładności i ograniczeń systemów nawigacyjnych.
EK2	Ma wiedzę w zakresie: właściwości i propagacji fal elektromagnetycznych, parametrów fal radiowych, wzorców i skali czasu, układów odniesienia oraz zjawisk wpływających na ruch satelity w Ziemijskim polu grawitacyjnym. Zna budowę i zasadę działania poszczególnych systemów nawigacyjnych.			
Metody oceny	Zaliczenie pisemne.			
Kryteria/ Ocena	2	3	3,5 - 4	4,5 - 5
Kryterium 1 Posiada wiedzę w zakresie: właściwości i propagacji	Nie posiada wiedzy w zakresie EK3.	Posiada wiedzę w zakresie właściwości i propagacji fal radiowych.	Posiada wiedzę w zakresie właściwości i propagacji fal radiowych. Zna wzorce	Posiada wiedzę w zakresie właściwości i propagacji fal radiowych. Zna wzorce

fal elektromagnetycznych, parametrów fal radiowych, wzorców i skal czasu, układów odniesienia.			i skale czasu.	i skale czasu oraz układy odniesienia.
Kryterium 2 Posiada wiedzę w zakresie zjawisk wpływających na sztuczne satelity.	Nie posiada wiedzy w zakresie EK4.	Posiada wiedzę w zakresie praw rządzących ruchem w polu grawitacyjnym.	Posiada wiedzę w zakresie elementów orbity satelity.	Posiada wiedzę w zakresie praw rządzących ruchem w polu grawitacyjnym oraz elementów orbit satelity.
EK3	Potrafi pozyskiwać informacje z literatury, baz danych oraz innych źródeł, integrować je, dokonywać ich interpretacji oraz wyciągać wnioski i formułować opinie dotyczące efektywnego wykorzystania systemów nawigacyjnych w praktyce.			
Metody oceny	Sprawdziany i prace kontrolne w semestrze, zaliczenie laboratoriów			
Kryteria/ Ocena	2	3	3,5 - 4	4,5 - 5
Kryterium 1 Wykorzystanie publikacji, dokumentacji dotyczących systemów nawigacyjnych.	Nie potrafi pozyskać i zinterpretować podstawowych informacji dotyczących wymagań i wykorzystania urządzeń systemów nawigacyjnych.	Potrafi samodzielnie zinterpretować informacje zawarte w instrukcjach obsługi urządzeń systemów nawigacyjnych w celu prawidłowej ich eksploatacji.	Potrafi samodzielnie zinterpretować informacje zawarte w instrukcjach obsługi urządzeń systemów nawigacyjnych w celu prawidłowej ich eksploatacji oraz dokonać ich porównania z wymaganiami technicznymi opracowanymi dla tych urządzeń, również w języku angielskim.	Swobodnie korzysta z pozyskanych publikacji i dokumentacji również w języku angielskim właściwie ją interpretując dla zapewnienia bezpiecznej eksploatacji urządzeń systemów nawigacyjnych.

Szczegółowe treści kształcenia

SEMESTR II	SATELITARNE SYSTEMY RADIONAWIGACYJNE	AUDYTORYJNE	15 GODZ.
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1. Ruch sztucznego satelity w ziemskim polu grawitacyjnym.
2. System satelitarny GPS – budowa, zasada działania, dokładność.
3. System satelitarny GLONASS – budowa, zasada działania, dokładność.
4. System satelitarny Galileo – budowa, zasada działania, dokładność.
5. Wersje różnicowe GNSS (DGNSS) – metody, zasady działania, dokładności.
6. Pilotażowe systemy radionawigacyjne bliskiego zasięgu – budowa, zasady działania, dokładności.
7. System hiperboliczny Loran-C – budowa, zasada działania, zasięg, dokładność, poprawki.
8. Europejski system nawigacyjny Eurofix – budowa, zasada działania, zasięg, dokładność.
9. Radionamierzanie.
10. Systemy nawigacji zintegrowanej, wykorzystanie monitorów wielofunkcyjnych.
11. System automatycznej identyfikacji (AIS).
12. Wydawnictwa radionawigacyjne polskie i angielskie – ALRS.
13. Eksploatacja odbiorników systemów radionawigacyjnych.

SEMESTR II	SATELITARNE SYSTEMY RADIONAWIGACYJNE	LABORATORYJNE	30 GODZ.
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1. Wydawnictwa radionawigacyjne polskie i angielskie – ALRS.
2. Procedura uruchomienia i regulacji podstawowej odbiorników systemów radionawigacyjnych.
3. Prezentacja informacji w odbiornikach systemów radionawigacyjnych.
4. Kontrola poprawności pracy odbiorników systemów radionawigacyjnych.
5. Metody poprawienia dokładności parametrów wektora stanu statku wyznaczanych przez odbiorniki systemów radionawigacyjnych.
6. Programowanie parametrów trasy i prowadzenie nawigacji w odbiornikach systemów radionawigacyjnych.
7. Programowanie parametrów pracy i prowadzenie nawigacji przy pomocy zintegrowanego zestawu nadawczo-odbiorczego DGNSS/AIS.
8. Ocena dokładności wskazań odbiorników systemu hiperbolicznego Loran-C.
9. Ocena dokładności wskazań odbiorników systemów satelitarnych GNSS.

10. Ocena dokładności wskazań pozycji i kursu rzeczywistego kompasu GPS.

11. Radionamierzenie w paśmie UKF.

Bilans nakładu pracy studenta w semestrze II	Godziny	ECTS
Godziny zajęć z bezpośrednim udziałem nauczyciela: wykłady	15	
Godziny zajęć z bezpośrednim udziałem nauczyciela, o charakterze praktycznym: ćwiczenia, laboratoria, symulatory, zajęcia projektowe	30	
Godziny zajęć z bezpośrednim udziałem nauczyciela: udział w konsultacjach, zaliczeniach / egzaminach poza godz. zajęć dydaktycznych	2	
Własna praca studenta, w tym: przygotowanie do ćwiczeń, laboratoriów, symulatorów, w tym wykonanie sprawozdań, zadań	5	
Własna praca studenta: realizacja zadań projektowych	2	
Własna praca studenta: przygotowanie do zaliczenia, egzaminu	5	
Łączny nakład pracy	59	2
Nakład pracy związany z zajęciami wymagającymi bezpośredniego udziału nauczycieli:	47	1,5
Nakład pracy związany z zajęciami o charakterze praktycznym:	35	0,5

Zaliczenie przedmiotu

Wszystkie rodzaje zajęć z danego przedmiotu, odbywane w jednym semestrze, podlegają łącznemu zaliczeniu. Ocena z przedmiotu wynika z oceny poszczególnych zajęć, i oceny ewentualnego egzaminu i jest obliczana zgodnie z podanymi zasadami (średnia ważona): A/(E) 40%, C 30% L 30%; A/ (E) 40%, L 60%; A/(E) 40%, C 20%, L 20%, P 20%.

Ocena niedostateczna z zaliczenia którejkolwiek formy przedmiotu w semestrze powoduje niezaliczenie przedmiotu.

Zaliczenie przedmiotu w semestrze powoduje przyznanie studentowi liczby punktów ECTS przypisanej temu przedmiotowi.

Purpose:

The aim of the exercise is to familiarize students with the procedure of starting and adjusting the basic navigation systems receivers.

Theoretical issues:

Before starting the first exercise, the student is required to have a preliminary knowledge of the construction and operation of the receivers used during classes and the basic concepts of navigation which have been learned during last semester (definitions, eg latitude, longitude, magnetic declination, true and relative bearing, heading etc.).

The introductory part:

The introductory part of the first exercise is supplemented with a measurement card (report template):

- Header in the form of a table (**Name, surname, year, group, topic and exercise number, date of the exercise**)
- The purpose of the exercise

Report:

The report is a duly completed measurement card with the teacher's signature. The report should consist of the outputs analysis of the completed exercise, individual conclusion of each student and answers to questions provided by the teacher.

REPORT SHOULD BE COMPLETED AND DELIVERED AT THE NEXT CLASSES!!!

!!! TIME OF PERFORMING TASKS ON INDIVIDUAL STATION SHOULD NOT EXCEED 20 MINUTES !!!

BIOGRAPHY:

1. Ackroyd N., Lorimer R., *Global navigation - a GPS user's guide*, Lloyd's of London Press LTD, London
2. Kjerstad N., *Electronic and Acoustic Navigationsystems for Maritime Studies*, 2016

Stand No. 1 SAAB R5 SUPREME Navigation System MkII

Description of the system:



Saab R5 SUPREME



Saab R5 SUPREME

GENERAL OPERATION

SYSTEM NAVIGATION

The R5 SUPREME CDU is equipped with a resistive touch screen as well as a keypad to be used for operation of the system. When using the **Arrow keys** to navigate the system views, selected items will be highlighted by an orange frame. Press **ENTER** to open a view. Press to go back.



CHANGING PARAMETERS

Many views contain parameters that can be edited. To edit a parameter, press the parameter value or select it by using the **ARROW KEYPAD** and press **ENTER**.

Changes will not take effect immediately. Press **Save** on screen button after editing parameters to save and exit the view. Press **Back** on screen button to cancel changes.

Data can be entered to the system in the following ways:

1. **Text / Numbers:** A virtual keyboard/keypad will popup when editing text or number fields. Press characters on screen directly, or use **Arrow keys** to highlight and press **ENTER** key to input a character. Press **VIRTUAL KEYPAD ENTER** key to accept new input after editing. Press **ESC** to undo changes.
2. **Selection List:** Parameters with fixed values are displayed in a drop-down list, shown when the parameter value is pressed. Select one of the listed values.
3. **Selection List and numeric input:** In views like the **Send AIS Message** it is possible to select a target MMSI in a list of predefined values based on received targets MMSI. It is also possible to enter any MMSI number. To do this, select the **Numerical Input** choice and input a numerical value using the virtual numerical keypad shown.

DO NOT TURN OFF TRANSPONDER POWER WITHIN 2 SECONDS OF A PARAMETER CHANGE!

FEATURES

- 7" ultra-bright high contrast colour LCD
- Touch screen, keypad and USB keyboard support
- Ethernet, RS-422 and USB interfaces
- Use USB memory for quick software upgrades
- Load/save configuration with USB Memory
- Pilot Plug integrated in display
- Full AIS SART support
- Text messaging
- VHF communication test function
- R4 Navigation Sensor Compatible
- Gimbal or flush mounting
- Water resistant design
- Alarm acknowledge binary port
- Dual AIS systems in Hot Standby configuration

Stand No. 1
SAAB R5 SUPREME

Execution of the exercise:

Exercise begin with the receiver turned off.

1. Turn on the receiver with the PWR button 
2. Setting the main navigation page
 - 2.1. Select Main  >Navigate > Position. Take a note and describe all available information.
3. Brightness and contrast settings
 - 3.1. Select Main  > Maintenance > Configuration> Display> Visual Settings,
 - 3.2. **Take a note and describe** available modes.
4. Setting time and date:
 - 4.1. Select Main  > Maintenance > Configuration> Display> Time, enter the current local time (UTC Time, UTC Date
 - 4.2. Confirm your changes with the Save button. Take a note of the current time
 - 4.3. Press the Back button.
5. Settings of unit parameters
 - 5.1. When in Display Configuration, select the Units tab
 - 5.2. Take a note and describe available parameters and their units.
 - 5.3. Press the Back button.
6. Turn off the receiver
 - 6.1. Hold the PWR  button> Power Off for about 3s.

Stand No. 2.

MLR[®] FX 412 Pro DGPS system

Description of the system:



MLR FX 412 pro DGPS system



- . Display of the position in the hyperbolic networks Toran, Decca and Loran C.
- . Set-up of the navigation function.
- . Enter of a waypoint in hyperbolic co-ordinates and conversion in geographic co-ordinates.
- . Display of the waypoint's hyperbolic co-ordinates entered in geographic co-ordinates.
- . FAD waypoint function with display of its swinging circle.
- . Enter of corrections of hyperbolic or geographic positions

- . Vector Cartography chart including the chart outline of the paper chart.
- . Each CD-ROM includes the all the charts of an area, i.e. from 20 to 30 charts.
- . Loading software for P.C. compatible Window95, Window98 and NT4.0.
- . Software to access the MLR Web Site type MS Internet Explorer 3.02, Netscape 3 or equivalent.
- . Configuration P.C. : 486DX or equivalent, 16 M of RAM, minimum 256 colours, 65536 colours advised, screen resolution 640 x 480 pixels, CD-ROM driver and serial port available.
- . The FX312 PRO and the FX412 PRO can load up to 2 charts with display of 1 or 2 at the same time.

Stand No. 2.

FX 412 Pro DGPS system

EXECUTION OF THE EXERCISE:

1. 1. Turn on the receiver with the PWR button (green). Press the ENTER key to confirm the WARNING receiver limitations.
2. Setting the contrast and brightness
 - 2.1. By short pressing the PWR button, display the backlight and screen contrast window
 - 2.2. Use the horizontal ↔ and vertical ↓ cursor keys to set the above parameters according to the lighting conditions in the laboratory. Confirm by pressing the ENTER key.
3. Determining the receiver work area and setting the local time
 - 3.1. Press the **MENU** key and then on the alphanumeric keypad, press the 0 key to select **SYSTEM MENU** .
 - 3.2. Press key 2 and in the AREA OF USE submenu. **Take a note** the possible settings. Using the vertical cursor arrows ↓ select the AUTOMATIC option, confirm with the **ENTER** key.
 - 3.3. Press the **0** key to select the SYSTEM MENU submenu, then press the 3 key and select the LOCAL TIME function.
 - 3.4. Use the cursor and the alphanumeric keypad to enter the time zone appropriate to your location (ALRS vol. 2 chapter "Legal Time"). Confirm by pressing **ENTER**.
 - 3.5. Press key **1** to select the **MAP DATUM** function and use the vertical cursor arrows↑ to select WGS 84 ellipsoid, confirm with **ENTER**.
 - 3.6. Press the key 7 to select the **KEY PAD BLEEP** function and use the cursor ↓ to select the **NOT ACTIVE** option, confirm with the **ENTER** key
 - 3.7. Press the **9** key to select the **USER SETUP** function. **Take a note** the configuration information of the receiver (manual of the device p. 60).
4. Switch off the receiver by pressing and holding the **PWR** button for at least 3 seconds.

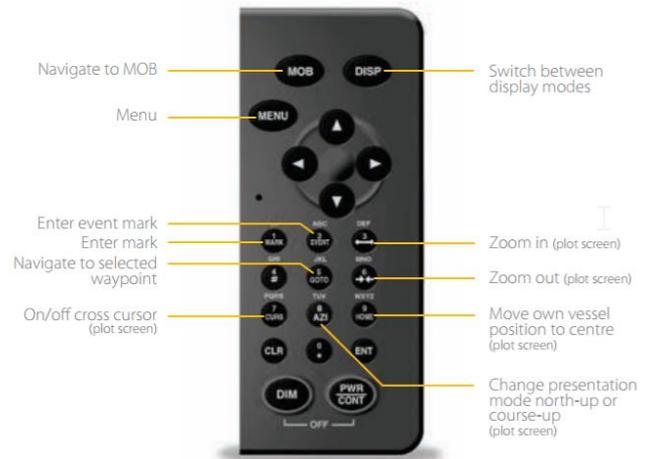
Stand No. 3

JRC GPS NAVIGATOR

Description of the system:



3.1. JRC GPS NAVIGATOR.



JRC's JLR-7500 GPS and JLR-7800 DGPS Navigator locate your position accurately, giving you a wide range of options to enhance optimal navigational performance, in part due to integrating the latest technologies with JRC's maritime product experience.

Key features include 3-D Highway enabling intuitive visibility of location of the next waypoint & real-time chain of waypoints along planned route, unified keyboard layout, and ability to connect two displays; synchronizing to the main unit via a LAN Connection, and user-friendly design.

JRC's JLR-7500 GPS and JLR-7800 DGPS Standard Features:

- 5.7 inch high visibility LCD with sharp contrast
- Smart Route Calculations via Great Circle and Rhumb line in the same route
- Various display modes available
- 10k waypoints can be stored in memory, with 100 routes (512 waypoints ea.)
- Advanced and flexible port configuration, the (D)GPS integrates 4 configurable NMEA ports
- LAN interface for route data transfer and inter-switching

Stand No. 3

JRC GPS NAVIGATOR

EXECUTION OF THE EXERCISE:

1. Turn on the receiver with the **PWR / CONT** button.
2. Setting the brightness and contrast
 - 2.1. By short pressing the **DIM** button, choose the screen brightness scale (three-level) appropriate to the prevailing lighting conditions in the laboratory.
 - 2.2. By short pressing the **PWR / CONT** button, choose the level of the screen contrast (thirteen levels) suitable for the user or MENU> **ENT**> 1.DISPLAY> **ENT**> 1.CONTRAST> **ENT**> up / down arrows.
 - 2.3. Day / night mode setting> MENU> **ENT**> 1.DISPLAY> **ENT**> down arrow to 6. REVERSING MODE> **ENT**> NORMAL> **ENT**. Take a note and describe the available options.
 - 2.4. Press the left arrow on the panel to return to the MAIN MENU
3. Time setting
 - 3.1. Having the active MAIN MENU with the up / down arrows select the tab 5: SYSTEM> **ENT**. Set the time zone as instructed by the Trainer.
 - 3.2. Select 2.DATE DISP> **ENT**. Take a note and explain the possible 3 impression formats. Choose any and confirm **ENT**.
 - 3.3. Select 3.TIME DISP> **ENT** Take a note 2 possible impression formats.
 - 3.4. Take a note all information from the top of the screen. Explain the meaning of the letters "**U**" and "**L**" displayed at the current time.
 - 3.5. Select the DISP button on the control panel. Take a note and explain all information available on the display.
4. Turn off the receiver by simultaneously pressing the **DIM + PWR / CONT** keys on the control panel.

Stand No 4. **GARMIN GPSMAP 2010C**

Description of the system:



GPS GARMIN GPSMAP 2010C.

Features

- WAAS-enabled, 12 parallel channel GPS sensor with 30ft cable length
- Unit dimensions 8.75" H x 13.0" W x 2.75" D, weight approx 5.0 lbs
- Dual card slots, accepts data cards programmed with GARMIN BlueChart cartography or data from most MapSource products
- GPSMAP 2010 display - 9.4" diagonal, 640x480 pixels, FSTN 10-level grayscale
- GPSMAP 2010C display - 10.4" diagonal, 256-color TFT, sunlight readable display
- 3000 user waypoints with name and graphic symbol; 50 reversible routes with 50 waypoints/route
- Position formats include Lat/Lon, UTM, Loran TDs, Maidenhead, MGRS and user grid
- Audible alarms for anchor drag, arrival, off-course, proximity waypoint and clock
- Large numbers option for easy viewing
- 5000 point automatic track log; 20 saved tracks let you retrace your path in both directions, 1000 points/saved track
- Course and speed filtering



Function Keys

The **IN** Key — adjusts the map scale to show a smaller area with more detail. (Zooms in)

The **OUT** Key — adjusts the map scale to show a larger area with less detail. (Zooms out)

The **PAGE** Key — cycles the unit through the main display pages in sequence and returns the display from a submenu page.

The **QUIT** Key — cycles the unit through the main display pages in a reverse sequence, restores the previous value in a data entry field, or cancels an unintended function such as a GOTO.

The **ENTER/MARK** Key — selects a highlighted menu option. When entering data, it allows you to initiate entry and then accept the selected value(s). It also marks the current location as a waypoint when pressed and held for more than one second.

The **MENU** Key — displays the Main Menu.

The **NAV** Key — displays a selection list allowing the user to select a navigation option.

The **FIND** Key — allows you to quickly access User Waypoints and other items used for navigation.

The **MOB** Key — immediately stores the location and gives the option of setting direct navigation.

The **POWER**  Key — is used to turn the unit on and off and to activate the backlight.

The **ARROW KEYPAD**  — is used to select (highlight) menu options and enter data. It controls the Left/Right and Up/Down movement of the cursor.

Stand No 4. **GARMIN GPSMAP 2010C**

EXECUTION OF THE EXERCISE:

1. Turn on the receiver by pressing the key marked with a light bulb and confirm the copyright warning by pressing **ENTER**
2. Setting the brightness
 - 2.1. By short pressing the button with the bulb, obtain the brightness scale,
 - 2.2. Using the cursor button ↓ select the brightness, suitable for the conditions in the laboratory, confirm the setting by pressing the **ENTER** key.
3. Time setting
 - 3.1. Press the **MENU** key and then use the vertical cursor arrows ↓ to select the **TIME** tab
 - 3.2. Press the right cursor arrow ► and use the **ENTER** key to open the **Time Format** window for editing. Use the vertical cursor arrows to select the **24 Hour** time format and confirm with the **ENTER** key.
 - 3.3. Press the down arrow ▼ and press **ENTER** to edit the Time Zone window. Take a note all available time zones. Select the **OTHER** option using the vertical cursor keys and confirm with **ENTER**. Press the right cursor arrow ► and with the **ENTER** key open the **UTC Offset** window for editing and enter the correct time difference (ALRS vol. 2 chapter "Legal Time").
 - 3.4. Check whether the correct data is displayed in the **Current Time and Current Date** windows. Synchronize your own watches or mobile phones with the time given in the receiver in accordance with the operating instructions appropriate for the device. With the left arrow of the cursor ◀ return to the vertical list of tabs.
4. SYSTEM tab
 - 4.1. Use the vertical arrows ↓ to select the **SYSTEM** tab. Press the right cursor arrow ► and the vertical cursor keys ↓ with the **ENTER** key to open the **Language** window for editing.
 - 4.2. Take a note all languages that can be set and then use the vertical cursor keys ↓ Explain **English**. Confirm the selection with the **ENTER** key.
 - 4.3. Press the down arrow ↓ and press **ENTER** to edit the **System Mode** window. Take a note the available modes of the receiver and then use the vertical cursor arrows ↓ select **Normal** and confirm with **ENTER**. With the left arrow of the cursor ◀ return to the vertical list of tabs.
5. Reference ellipsoid settings
 - 5.1. Use the vertical arrows ↓ to select the **UNITS** tab. Press the right arrow of the cursor ► and the vertical cursor keys ↓ with the **ENTER** key to open the **Map Datum** window for editing.
 - 5.2. Use the vertical cursor arrows ↓ to select WGS 84 and confirm your selection with the **ENTER** key.
6. Use the **PAGE** key to open the **Compass Page**, Take a note and explain the information provided.
7. Turn the receiver off by holding the "bulb" button longer

Stand No 5. **MAGELLAN FX324 MAP COLOR**

Description of the system:



GPS - Magellan FX324 with MBX-2.

This is a 12-channel parallel receiver with a 16-color TFT screen and remote antenna. Screen resolution is 320 x 240, or 5" on the diagonal.

Plotter operations are done on a full alphanumeric keypad, which makes entering waypoints and other information faster than the Toggle/Select/Enter method necessary on most machines without keypads. The Magellan also has a four-way toggle pad, used to adjust chart position and to select on-screen menu options. The Enter button is at the lower right corner of the machine, which enables the user to perform all functions easily with the right hand only. The green power button and red MOB button are set apart and easily identified. Between them, just to the right of the screen, are buttons to call up "Position," "Nav" functions, "GoTo" waypoints, and "Plot,"

showing the vessel's position on the chart. This last button should perhaps be called "Chart," since that's what it summons. A context-sensitive Menu button, and an Escape button, are above the toggle-pad.

In the Plot mode, the "7" button serves as zoom-out, and the "9" as zoom-in. The "8" allows a choice of pre-set zoom levels, selected by the Enter button. The zoom keys could be better marked, in our opinion, but it doesn't take long to get used to them.



The Magellan FX324—button ergonomics, user interface, and cartography are good, and receiver sensitivity seems excellent. Just give it some shade.

Stand No 5.

MAGELLAN FX324 MAP COLOR

EXECUTION OF THE EXERCISE:

1. Start the MAGELLAN FX324 MAP COLOR receiver by pressing the PWR button and confirming the warning with the **ENTER** key.
2. Restoring the receiver to the default settings.
 - 2.1. Press the key: **MENU**.
 - 2.2. From the available tabs Menu (yellow color - top screen strip) select the **SETUP** tab.
 - 2.3. From the displayed field of the setup tab select the field with the number "7" (Default Configuration - Default settings).
 - 2.4. Read and Take a note the information presented in the Message dialog box and confirm it (YES - highlighted in red) by pressing **ENTER**.
 - 2.5. In the language selection window (Choose language) confirm the selected "English" with the **ENTER** button.
 - 2.6. Confirm the "Warning" warning window with **ENTER**.
3. Brightness adjustment.
 - 3.1. Press the **PWR** key, decrease the left arrow and then the right arrow to increase the brightness of the screen, adjusting it to your own preferences. Confirm the selection with the **ENTER** key.
4. Setting the local time.
 - 4.1. Press the **MENU** key, the **POS** tab will be highlighted in blue, which means it is active. Use the "2" button to select the Local Time field. Set the current local time using the alphanumeric keys. Confirm the new time setting by pressing **ENTER**.
5. Read the current geographical position by pressing the POS function key. Take a note of the position.
6. Describe all the MENU tabs in the form: abbreviation English -> develop a shortcut in English (use the company's instructions).
7. Turn off the receiver with the **PWR** key. Keep the key pressed down as long as the countdown goes down to zero.

Stand No 6. FURUNO GP-80 system with FURUNO GR-80 system DGPS

Description of the system:



FURUNO GP-80

The GP-80 GPS Navigator is a totally integrated GPS receiver and video plotter consisting of a display unit and an antenna unit. The high sensitivity receiver tracks up to eight satellites simultaneously. An 8-state Kalman filter ensure optimum accuracy in determination of vessel position, course and speed. In most cases the operator need do no more than turn on the power to find position. The main features of the GP-80 are • Comprehensive navigation data displays • Storage for 999 waypoints and 30 routes • Alarms: Arrival, Anchor Watch, Crosstrack Error, Ship's Speed, Water Temperature, Depth, and Trip • Man overboard feature records latitude and longitude coordinates at time of man overboard and provides continuous updates of range and bearing to that point • DGPS capability—with built-in DGPS beacon kit, or accepts DGPS correction data from external DGPS beacon receiver • Menu-driven operation • Bright 122 x 92 mm LCD with temperature compensated tone and brilliance adjustment • Power consumption is a low 10 W. • Provision for connection of autopilot (option)—steering data output to autopilot • Digital display of water temperature and depth with connection of video sounder (with NMEA input) • Memory stores 2,000 points of track and marks • "Highway" display provides perspective view • Position may be shown in latitude and longitude or LOP (Loran or Decca) • Four connectors for optional equipment two IEC 61162-1/NMEA 0183 I/O, one

IEC 61162-1/NMEA 0183 (or log) output and one DGPS for personal computer) I/O

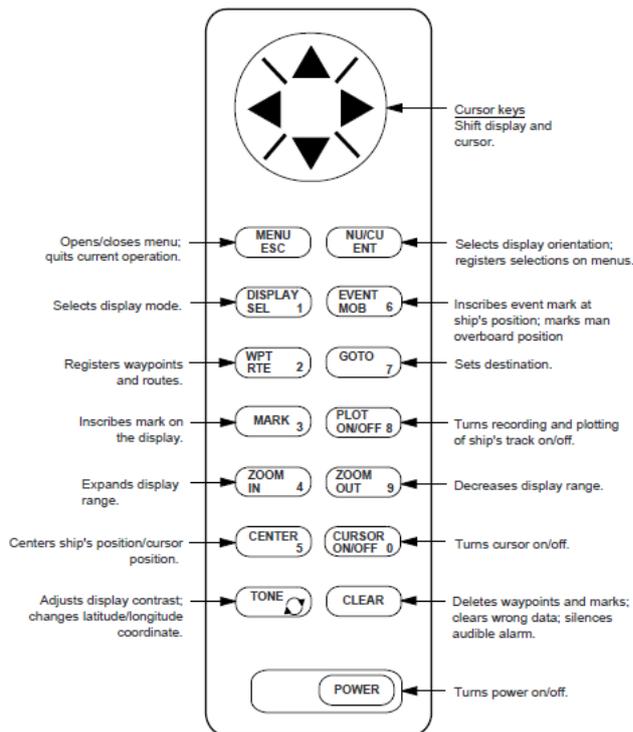


Figure 1-1 Control panel

Control panel GP-80.

Stand No 6.

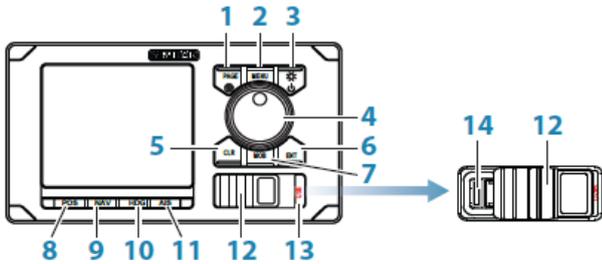
FURUNO GP-80 system with FURUNO GR-80 system DGPS

EXECUTION OF THE EXERCISE:

1. Turn on the power supply with the **POWER** button, wait for the test program to end,
2. Memory cleaning;
 - 2.1. enter the main menu, **MENU** key
 - 2.2. choose item **9. SYSTEM SETTINGS**
 - 2.3. choose the item **9. CLEAR MEMORY**
 - 2.4. select the **CLEAR GPS** option and confirm your selection with the **ENT** key
3. Setting the starting position
 - 3.1. from the main menu, select item **9. SYSTEM SETTINGS**
 1. 3.2. then select **6. GPS SETUP**
 2. 3.3. use the up arrow to select page 2/2
 3. 3.4. enter the position
$$\varphi = 53^{\circ}25' \text{ N}$$
$$\lambda = 014^{\circ}33' \text{ E}$$
 confirm with the **ENT** key
4. After the exit of the main menu (**MENU** key), press the **1 DISPLAY SEL** key
 - 4.1. select the **DATA** screen and confirm with the **ENT** key
 - 4.2. Take a note the information displayed on the screen
5. DGPS options
 - 5.1. from the main menu, select **9. SYSTEM SETTING**
 - 5.2. then select item **7. DGPS SETUP**
 - 5.3. setting the reference station switch to **MAN** (manual),
 - 5.4. set the frequency and baud rate (**BAUD RATE**) according to the instructor's recommendation, confirm the selection with the **ENT** key
 - 5.5. go to the **MENU / ESC** menu
6. GPS options
 - 6.1. Select item **7. GPS MONITOR** from the main menu
 - 6.2. Take a note the available data for **BEACON RCVR MONITOR, SATELLITES MONITOR** (pages 8-12). To change the screen, use the **TONE** key
7. Turn off the receiver with the **POWER** button

Stand No 7 SIMRAD MX 610

Description of the system:



SIMRAD MX610

The MX610 is a type-approved navigation systems designed for the professional mariner. Offering convenient data interface using either SimNet or NMEA 2000, set up and connection to other devices couldn't be simpler. Utilising the trusted MX521A GPS/DGPS smart antenna and MX61x junction box, this is a complete professional navigation system for any professional vessel requiring IMO type-approved electronics.

1. Control and Display Unit
2. Easy to install with standard NMEA 2000 interface
3. easy operation
4. MOB and four hotkeys POS, NAV, HDG, and AIS (class B AIS)
5. For use with with MX521A GPS/DGPS smart antenna
6. MX610 system has four NMEA 0183 I/O ports
7. External MOB and external alarms are integrated features in the CDU console

No.	Key Description
1	PAGE key: Brings up different screen page every time this key is pressed or to change tab in the settings and tools menu.
2	MENU key: Brings up the quick menu dialog box.
3	PWR/LIGHT key Short press - to turn ON the unit. Momentary press brings up the backlight and night view controls. Series of short presses will cycle through 6 levels of display brilliance. Long Press - to turn power off.
4	ROTARY KNOB : Rotate to scroll through menu list, icons, alphabets or numbers in the virtual keypad and zoom-in or out in the PLOT mode. Press the center of the knob to select menu item or accept entry. The same entry action when you press the ENT key.
5	CLR key: Press to clear, escape or back out of the menu or data entry.
6	ENT key: Press to accept menu selection or data entry. The same action as pressing the center of the rotary knob.
7	MOB key: Short press will save the present position L/L into the next vacant waypoint. Press and hold for 3 seconds activates the Man-Over-Board (MOB) function.
8	POS key: Hot key to display the present position Latitude, Longitude, COG, SOG, Date and Time. Press repeatedly to show POS1, POS2 or POS3 screens.
9	NAV key: Hot key to display the navigation information. Press repeatedly to show NAV1, NAV2 or NAV3 screens.
10	HDG key: Hot key to show the compass rose, Pitch, ROT and Yaw information coming from a gyro or a GPS compass. Press repeatedly to show HDG1 or HDG2 screens
11	AIS key: Hot key to display the PLOT screen showing your vessel, waypoints, route and other navigation information. Will show AIS targets when connected to an AIS receiver via the NMEA 2000 network.
12	USB door: To open, lift the right tab and slide the cover to the right. To close, slide cover to left and push the tab down. Close USB door at all times to prevent moisture intrusion. (MX610 and MX612 only)
13	USB key: Press to display the files contained in the USB memory stick.
14	USB Connector

Stand No 7 **SIMRAD MX 610**

EXECUTION OF THE EXERCISE::

1. Switch on the receiver using the **PWR / LIGHT** key
2. Setting the brightness
 - 2.1. press the **PWR / LIGHT** button again to set the brightness suitable for the environment,
3. System settings
 - 3.1. press **MENU**, then use the dial to select **TOOLS and SETTINGS** and confirm with **ENT** or pressing the dial
 - 3.2. choose **SYSTEM** and confirm with the **ENT** key,
 - 3.3. set the appropriate time zone,
 - 3.4. choose to display local time in a 24-hour system
 - 3.5. set the text size
 - 3.6. check the ABOUT tab,
 - 3.7. check available languages, choose English.
4. Available pages
 - 4.1. next press the **PAGE** button to check how many and what pages are available and what they represent
 - 4.2. Take a note the observations.
5. Turn off the receiver by long pressing the **PWR / LIGHT** key.