

# DV BUDDY



## DV BUDDY SYSTEM SAFELY TO THE BOAT



# PARTNER FOR SAFE DIVING

from divers for divers

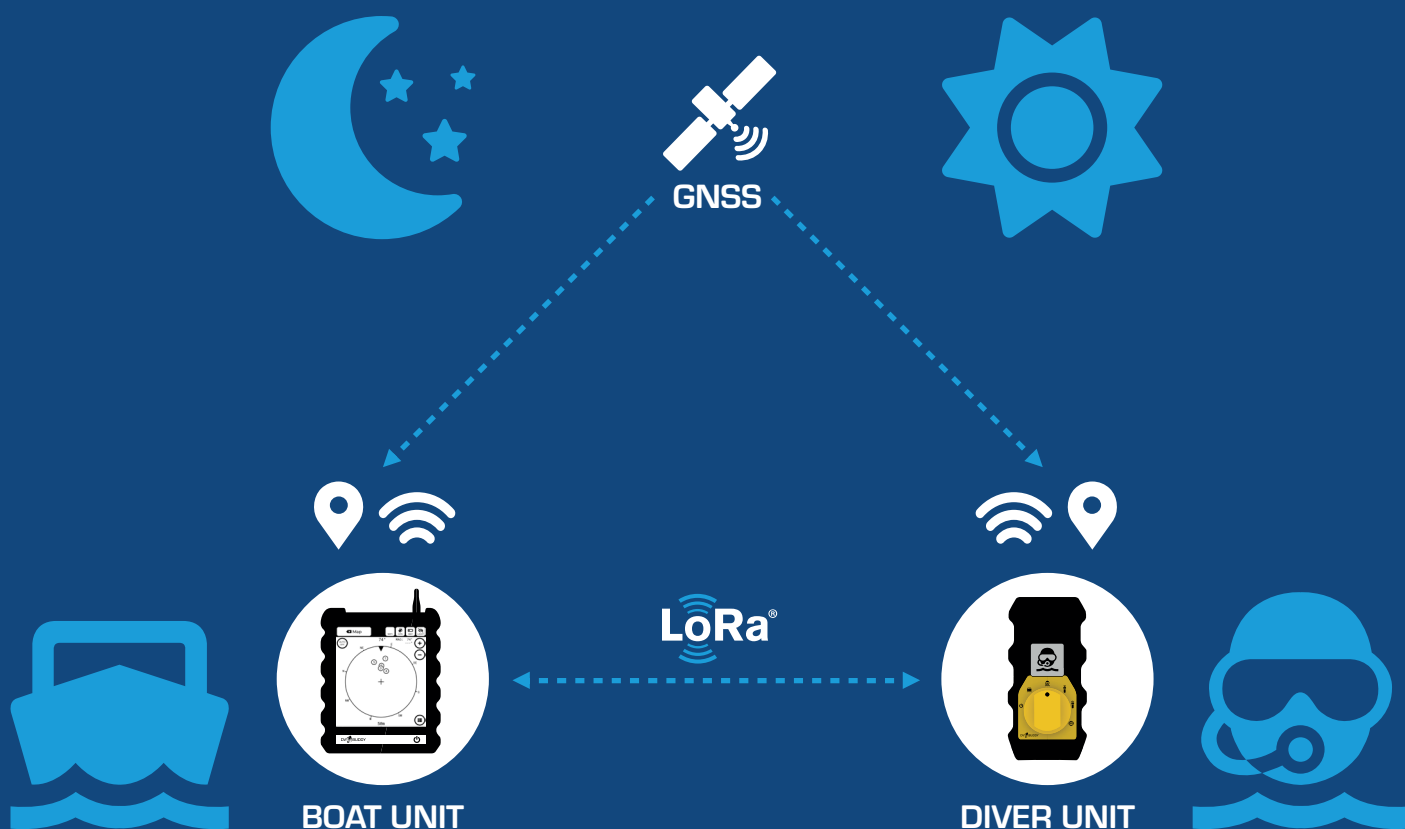


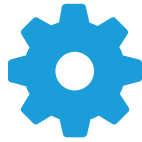


# INTRODUCTION

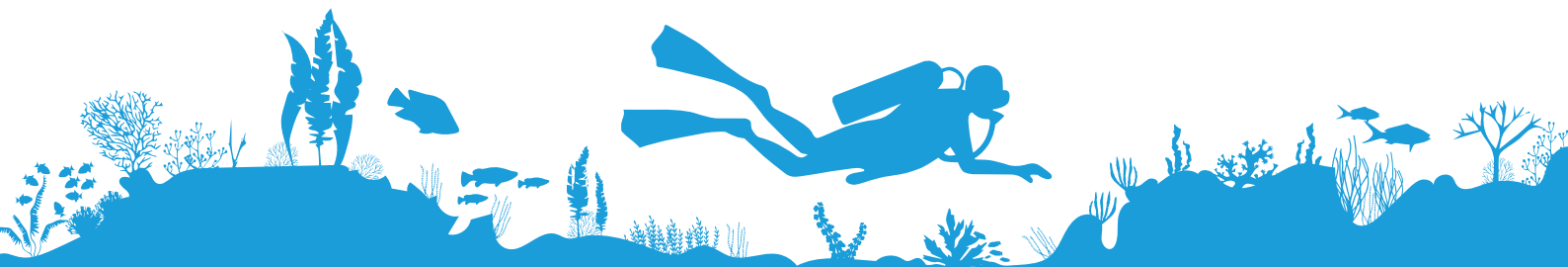
The **DV BUDDY system** allows for the localization of a diver up to a distance of 10,000 meters, both day and night, in any weather conditions.

The system consists of one boat unit (BU) and one or more diver units (DU). Both units are equipped with a GNSS (GPS+GLONASS+Galileo) module for determining the position of the boat and diver, as well as a LoRa module designed for mutual communication between the BU and DU. When the diver surfaces, his GPS position is transmitted via LoRa to the boat unit. This unit displays the diver's position relative to the boat on a map, along with the distance from the boat and the time since surfacing. During the dive, the diver unit (DU) collects information on dive depth, water temperature, direction, and speed for further analysis.





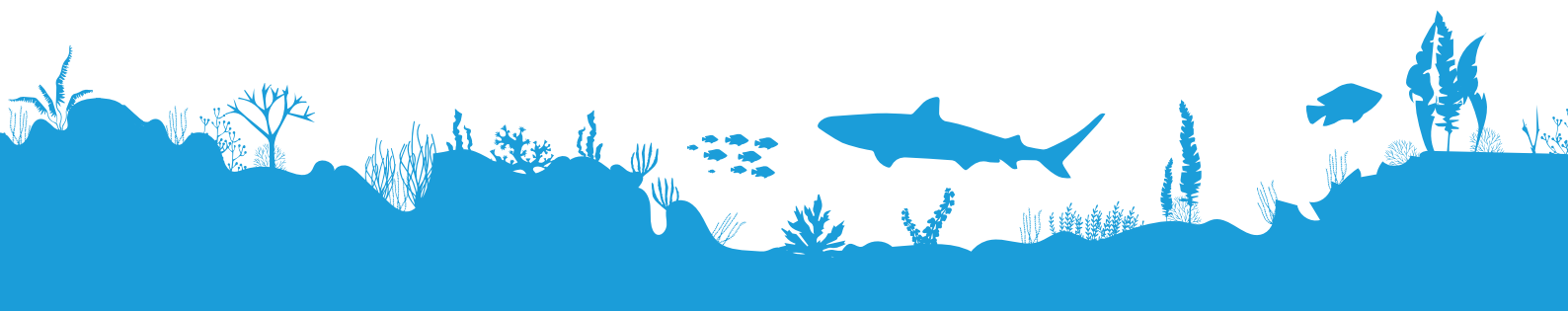
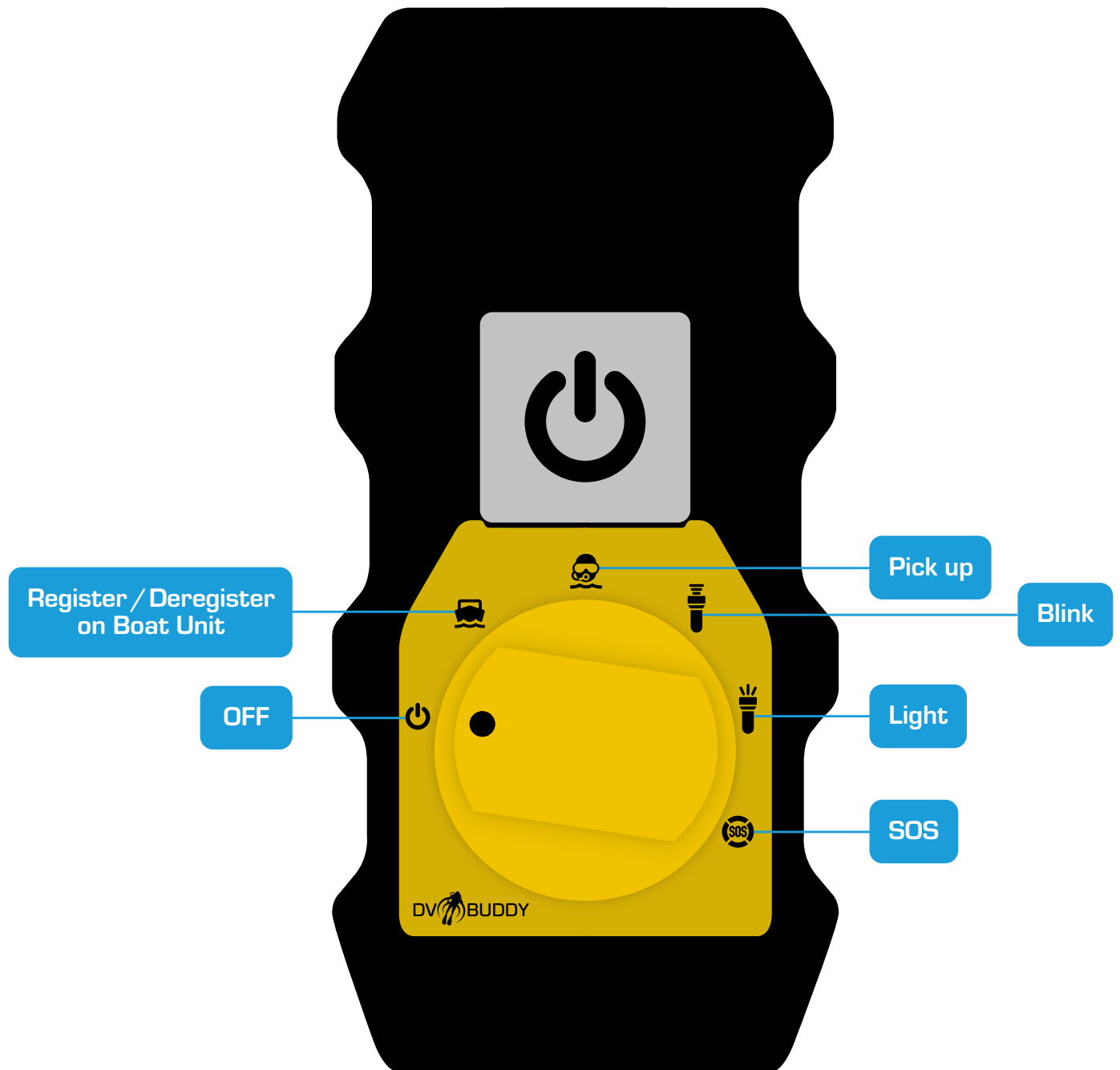
# QUICK INSIDE





# DIVER UNIT

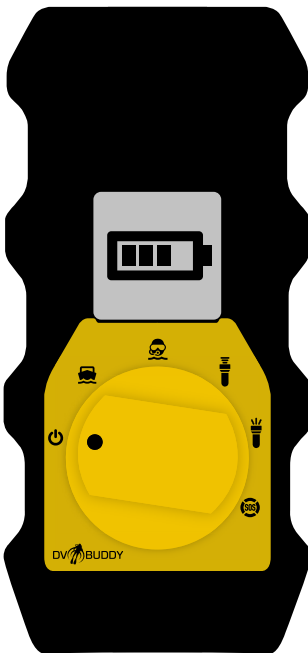
## ROTARY SWITCH POSITION



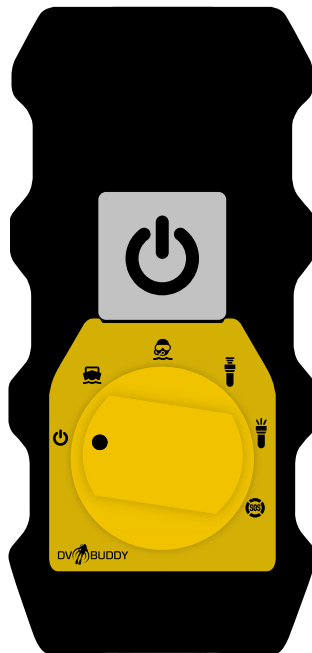


# DIVER UNIT

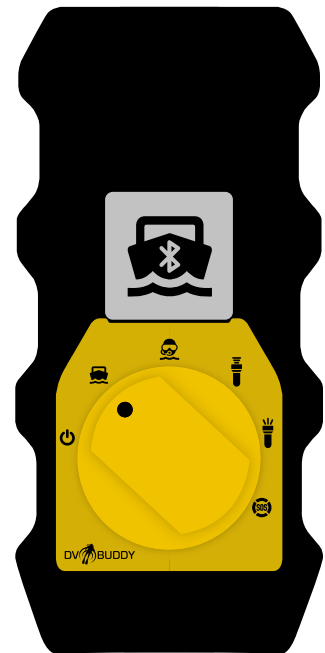
## DISPLAY ICONS AND MEANING



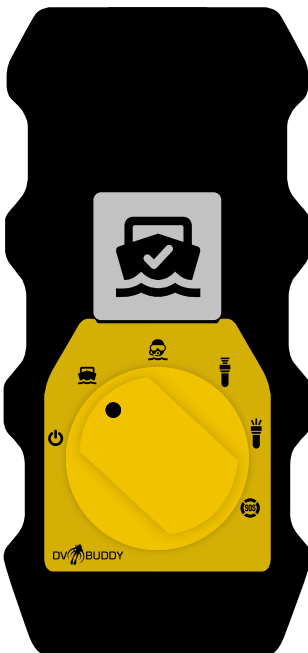
**Charging**



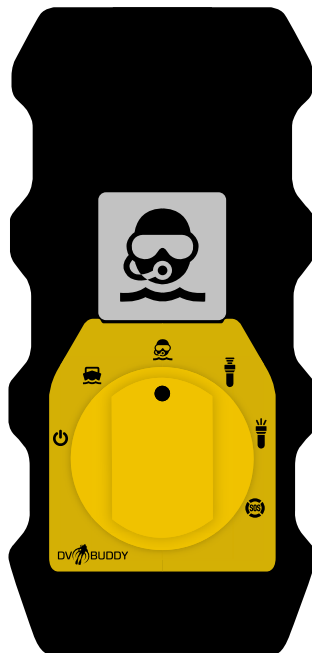
**Off**



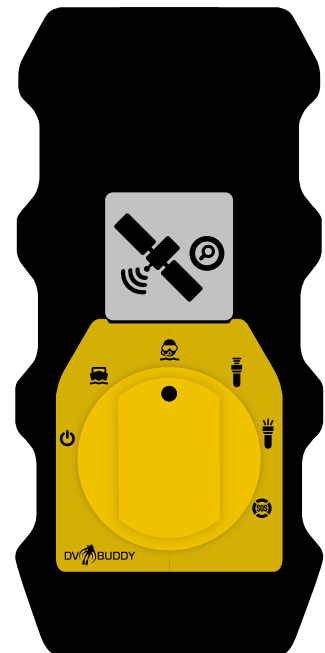
**Registration**  
Waiting for registration  
into Dive Session on BU



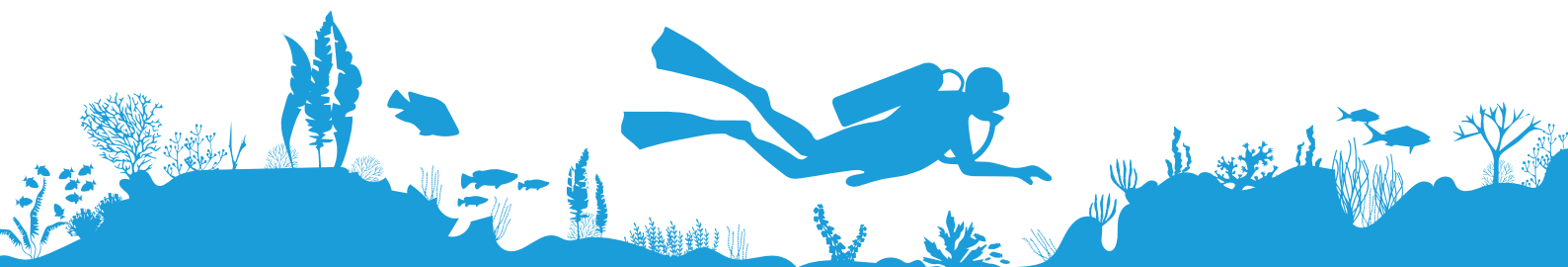
**Registration**  
DU registered  
in Dive session on BU



**Pick up**  
Diver surfaced  
Request for pick up to BU



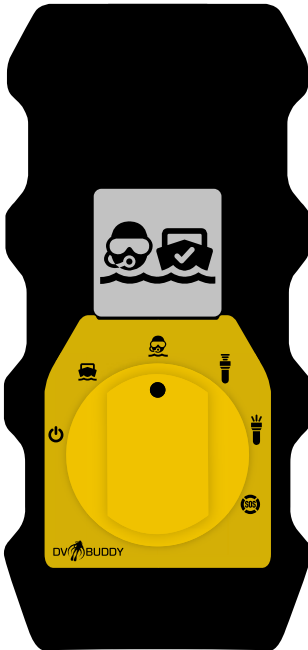
**Pick up**  
Waiting for GPS



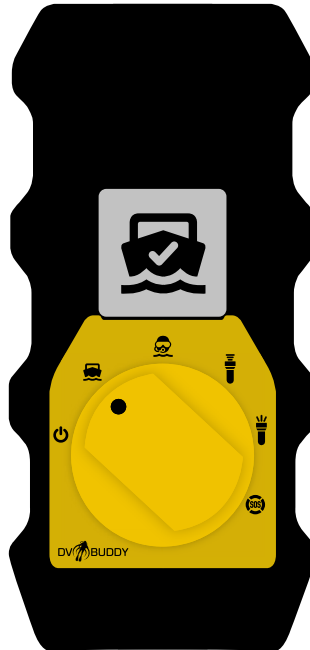


# DIVER UNIT

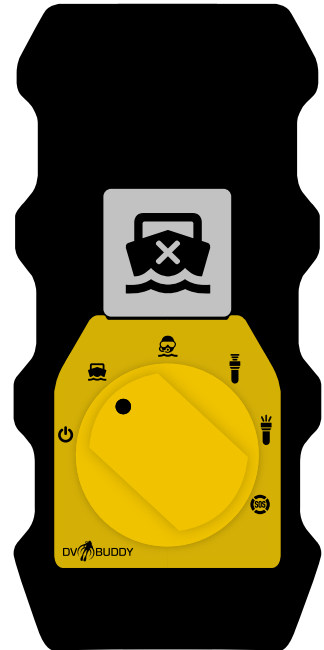
## DISPLAY ICONS AND MEANING



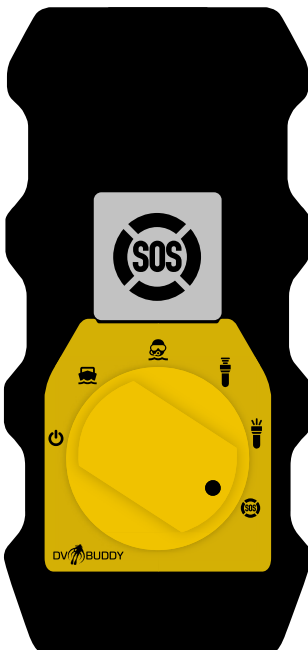
**Pick up**  
Request received by BU



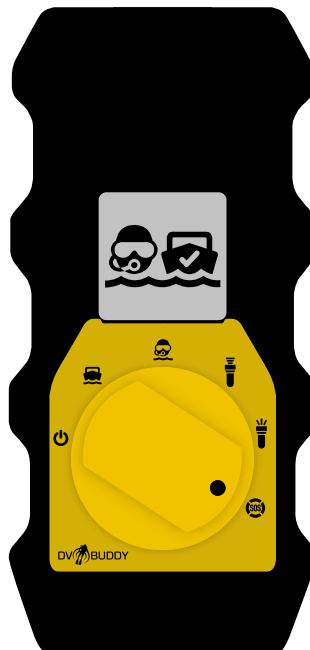
**Deregistration**  
Waiting for BU and deregistration  
from Dive session



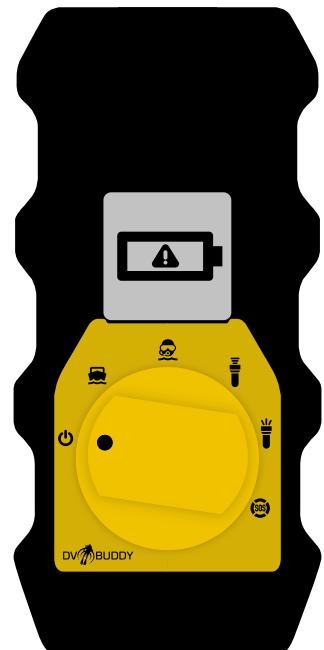
**Deregistration**  
Deregistration completed  
Diver closed Dive session



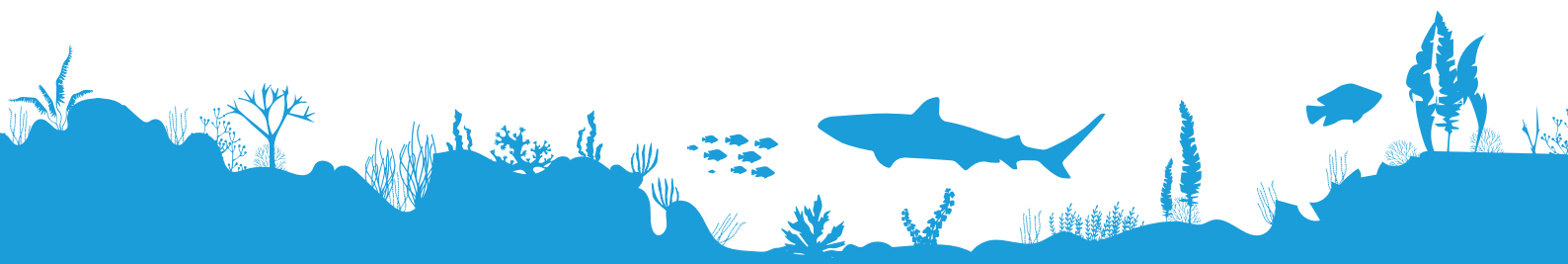
**SOS**  
Pick up request



**SOS**  
SOS request received  
and Confirmed by BU



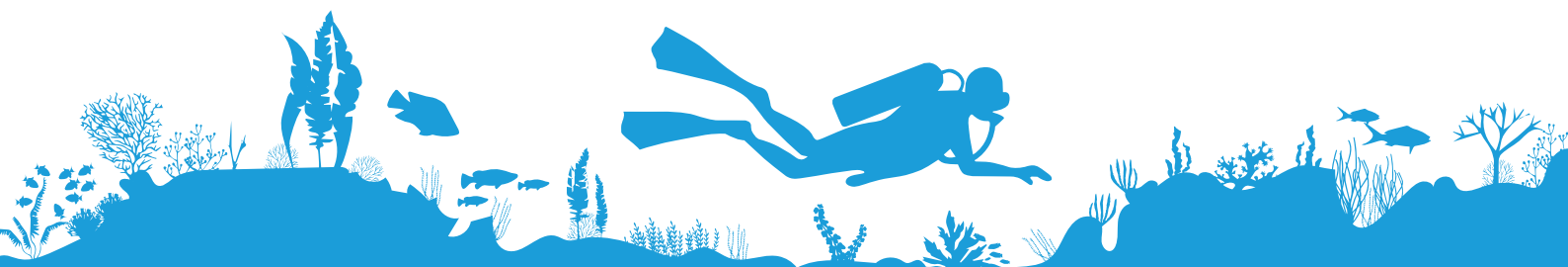
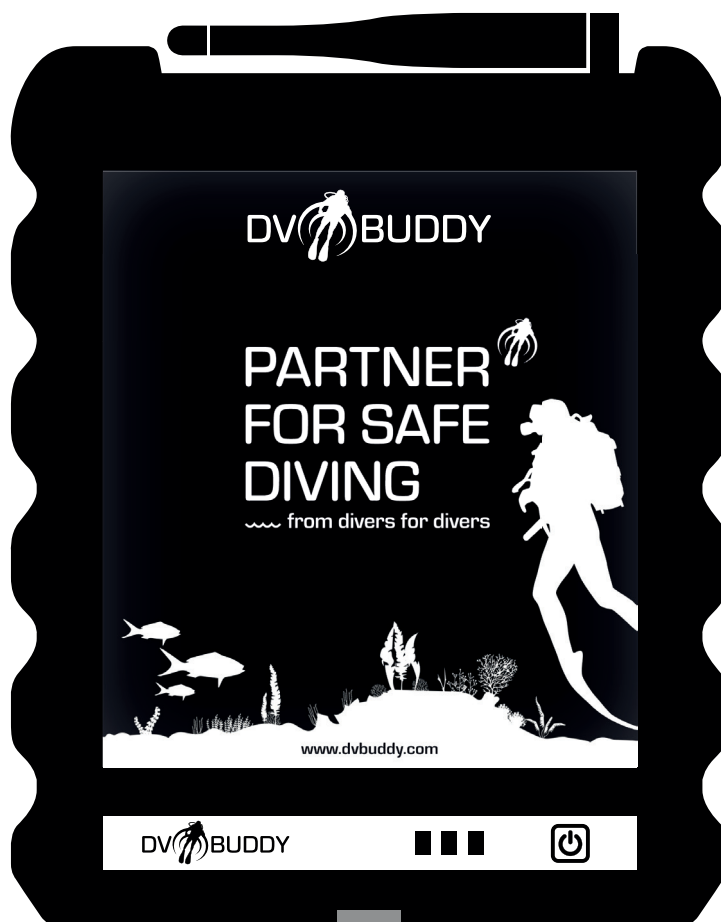
**Battery discharged**  
Place DU on wireless  
charger coil





# BOAT UNIT

## EXTERNAL TILTING ANTENNA



# BOAT UNIT

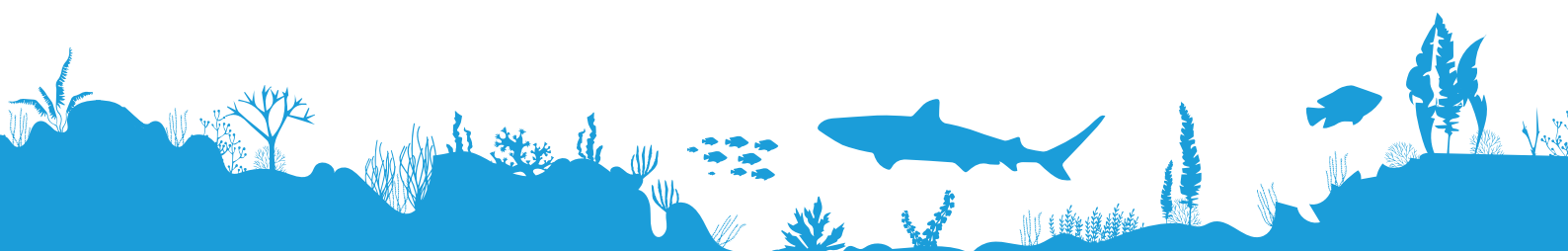
## INDICATION AND CONTROL ELEMENTS



- 1 Switch ON/OFF button  
Press to switch ON  
Press and keep for  
2 seconds to switch OFF  
5 seconds to RESET device

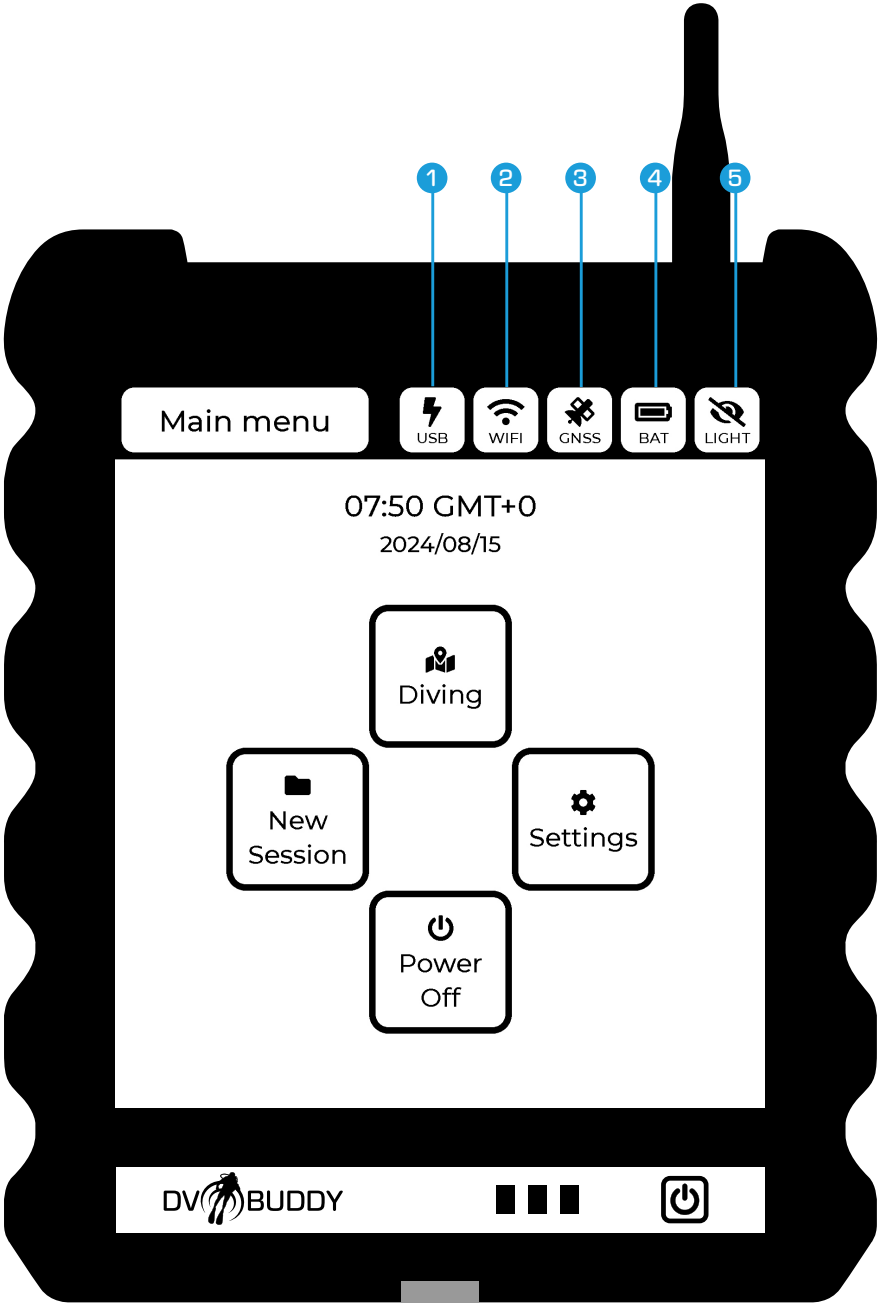
### LED indicators

- 2 Red LED  
Error status
- 3 Green LED blinking  
(operational  
mode/charging)
- 4 Blue LED  
Lorem ipsum
- 5 USB-C connector  
(charging)



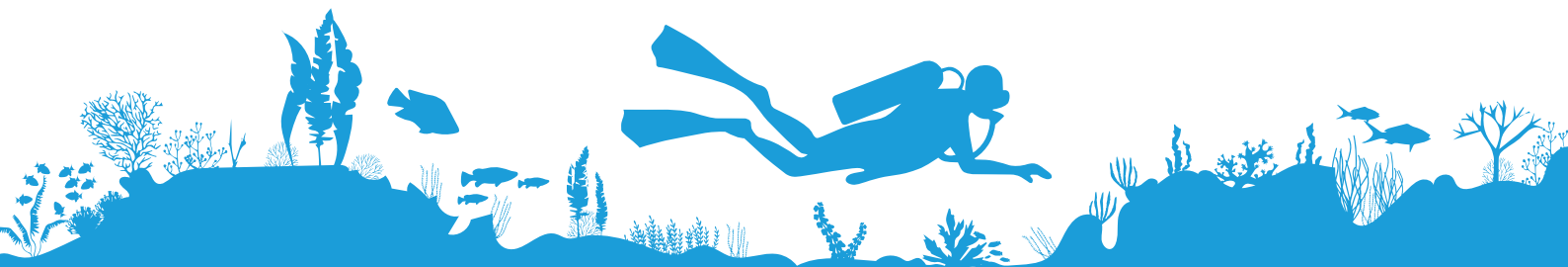


# MAIN MENU SCREEN

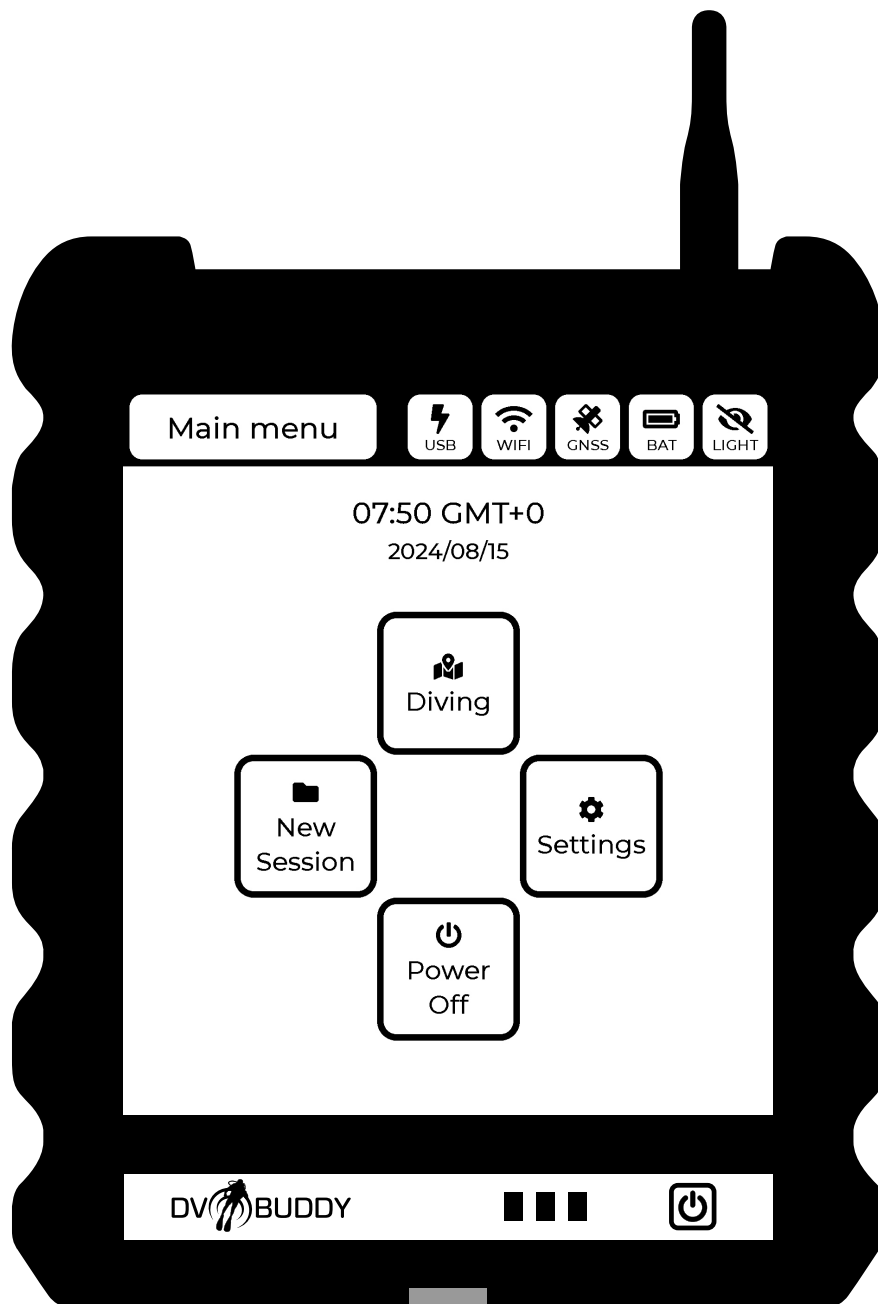


## Top Status bar Icons

- 1 USB/charging connection
- 2 WiFi connection
- 3 GNSS status
- 4 Battery status
- 5 Backlight On/Off

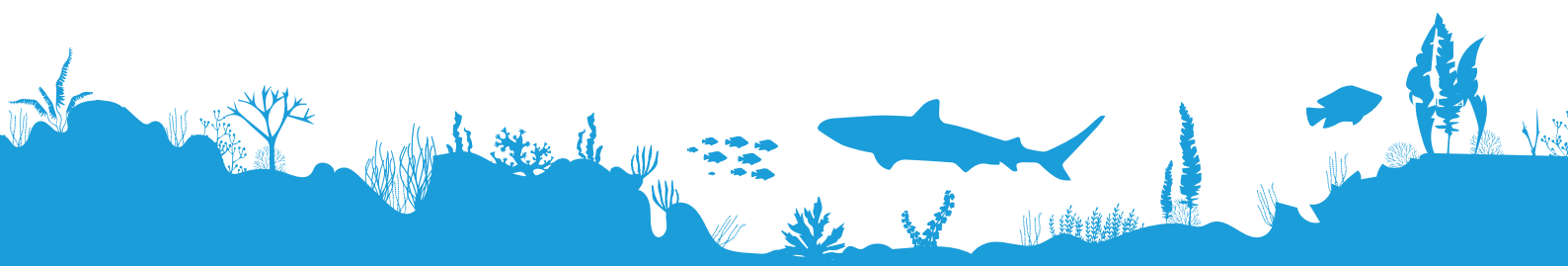


# MAIN MENU SCREEN



## Diving

- ✓ Allows registration and deregistration of diver into/from Dive session
- ✓ Shows list of divers in Dive session
- ✓ Shows position of divers on Map with electronic compass
- ✓ Automatic/manual Zoom
- ✓ Provides Status of diver
  - Diving
  - Waiting for pick up
  - SOS
  - Distance from boat
  - Azimuth (bearing)
  - Time since surfacing





# MAIN MENU SCREEN



## Settings

- ✓ Set up of parameter used by device
- ✓ Submenu
  - GUI
    - Brightness setting
    - Horn setting
  - WiFi connection
  - Time Zone
  - Compass - calibration
  - LoRa Region setup
  - Factory Setup

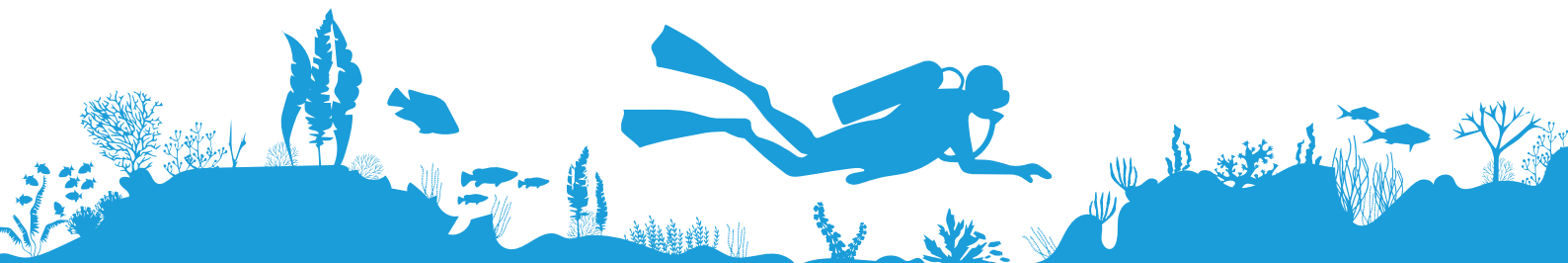
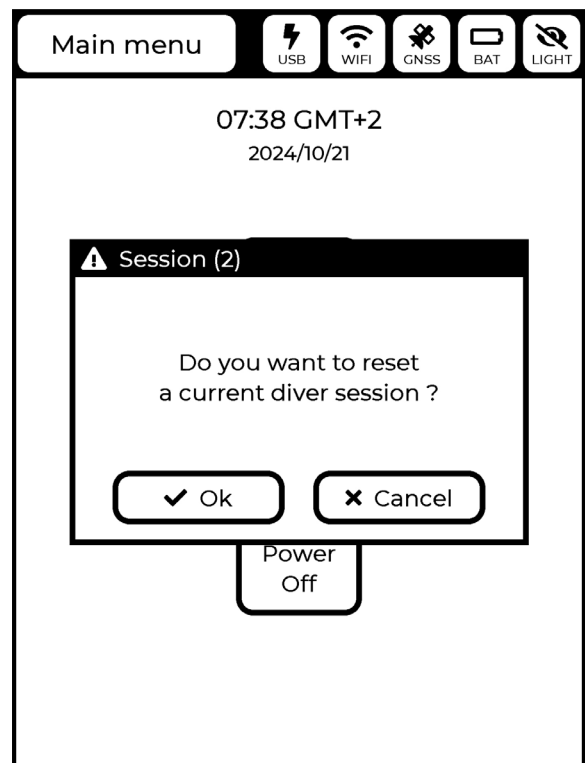
## New Session

- ✓ Dive Session represents List of divers from the boat participating in a joint dive at a specific location and time.
- ✓ This function **Deletes** all information (list of divers) from current Session and creates New, empty dive session.
- ✓ Use it carefully and only before new dive starts or after all divers from Session on the boat.

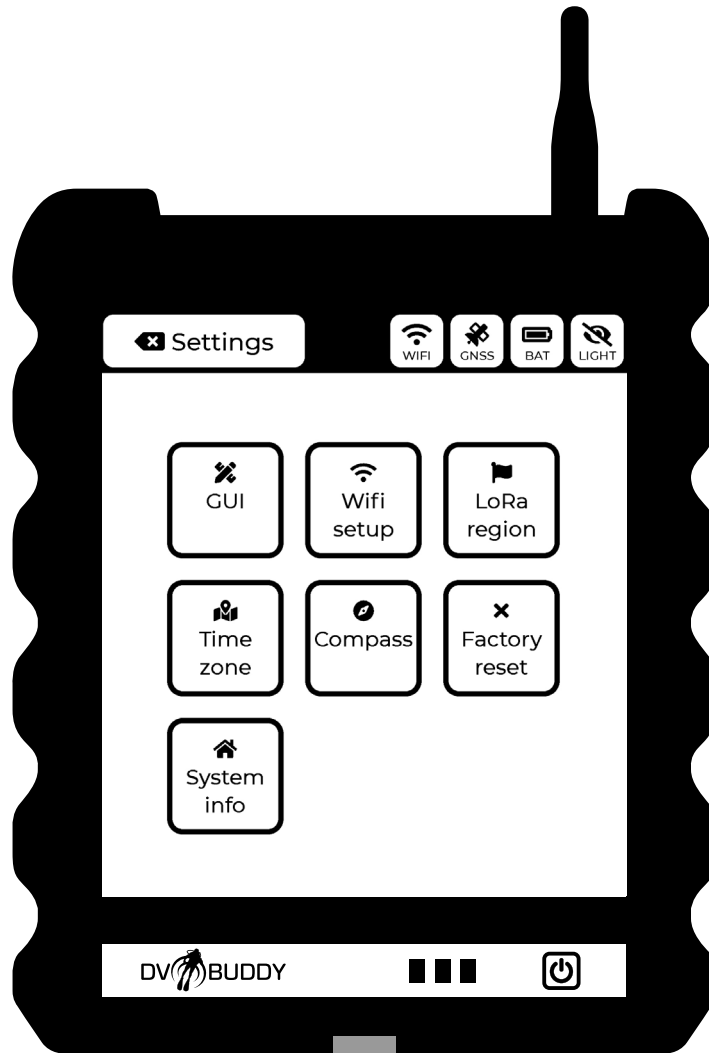


## Power Off

- ✓ Switch OFF device
- ✓ Ongoing dive session and information is saved

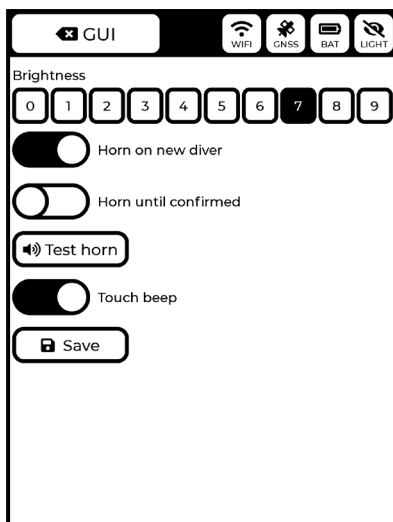


# SETTINGS MENU



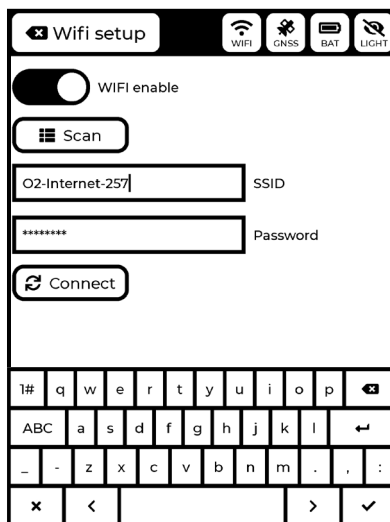
## GUI

- ✓ Set up basic parameters like display brightness, horn setting etc.



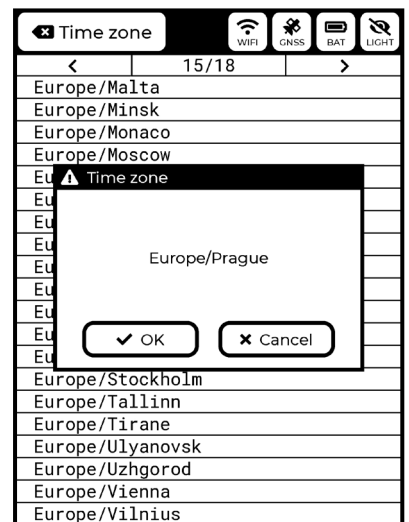
## WiFi

- ✓ Set up of wifi connection



## Time zone

- ✓ Manual setting of time zone





# SETTINGS MENU

## Compass

- ✓ This choice allows calibration of compass
- ✓ Calibration is recommended to do before the first usage of device in new location
- ✓ Follow the instructions on the screen and aim to reach the maximum possible score until there is no change in the score

## LoRa Region

- ✓ System offers LoRa settings (frequency plan) according regions and countries rules. Please check on websites proper LoRa Norm in your location and set it up accordingly. \*

[www.thethingsnetwork.org/docs/lorawan/frequency-plans](http://www.thethingsnetwork.org/docs/lorawan/frequency-plans)

[www.thethingsnetwork.org/docs/lorawan/frequencies-by-country](http://www.thethingsnetwork.org/docs/lorawan/frequencies-by-country)

- ✓ Language setting
- ✓ Units - Metrics/Imperial
- ✓ Easy Dive Mode
  - After the diver surfaces, this mode automatically switches the DU to the Pickup Request mode
  - The Condition is that
    - The diver must have reached at least a depth of 3 meters for a minimum duration of 30 seconds!
    - Easy dive mode is "ON" before Registration of divers into Session starts!

## Factory reset

- ✓ Reset device and set up "Factory", original parameters

\*Please check applicable regulations and requirements for the use of LoRa devices in your area. The LoRa frequency band setting must comply with the applicable legislation and national standards. **The manufacturer and seller are not responsible for any problems arising from incorrect LoRa frequency band settings.**

Compass

Compass calibration steps:

1. Rotate device around all three axis until score value reach its maximum.
2. After score value is not changing anymore, point device to the north and click on Save button.

Score: 18758

Save

LoRa region

Frequency plan

EU868	US915	AU915	AS923
AS923-2	AS923-3	AS923-4	KR920
IN865	RU864	MA869	KZ865

Language

English	Czech	Spain	German
French	Chinese	Arabic	Russian

Imperial units

Easy dive mode

Save

Settings

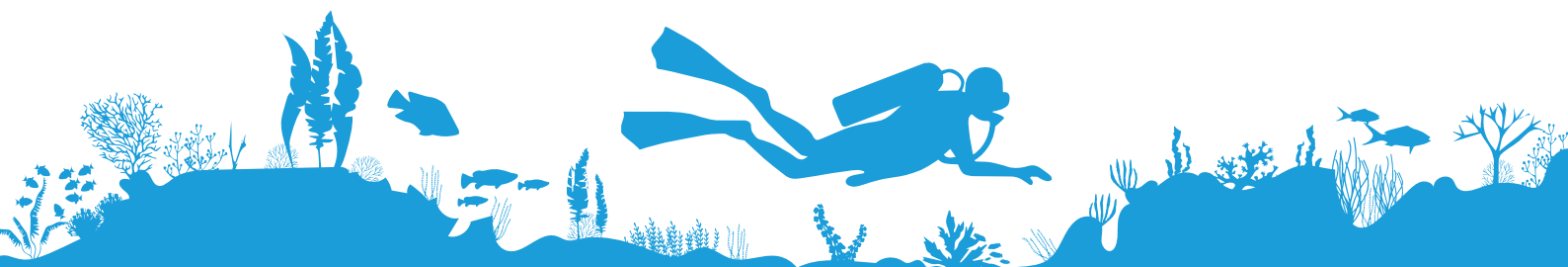
Build: 2024-08-15T03:41:25  
Git: 368a4169-dirty  
Uid: 0441FC

Factory reset (2)

Do you want to reset all settings to default ?

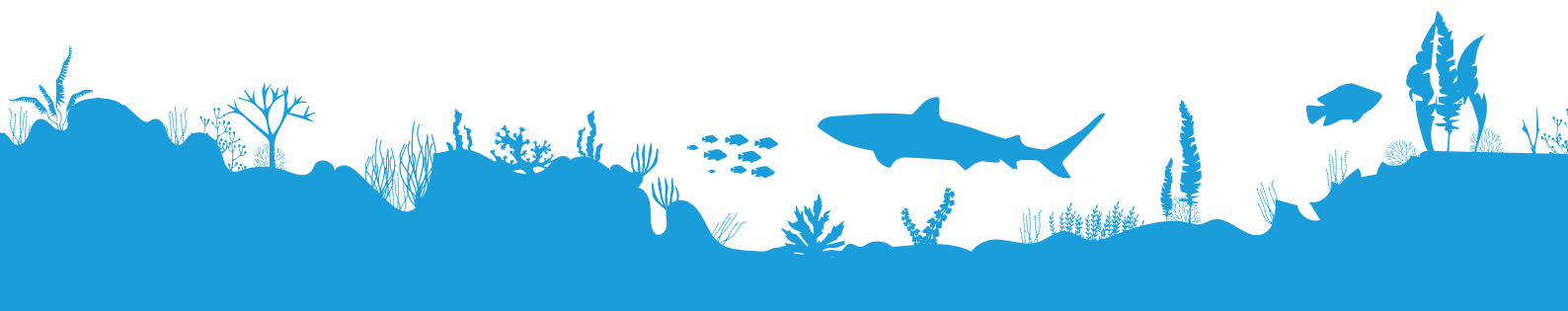
Reset Cancel

Factory Reset LoRa Region





# OPERATION MANUAL

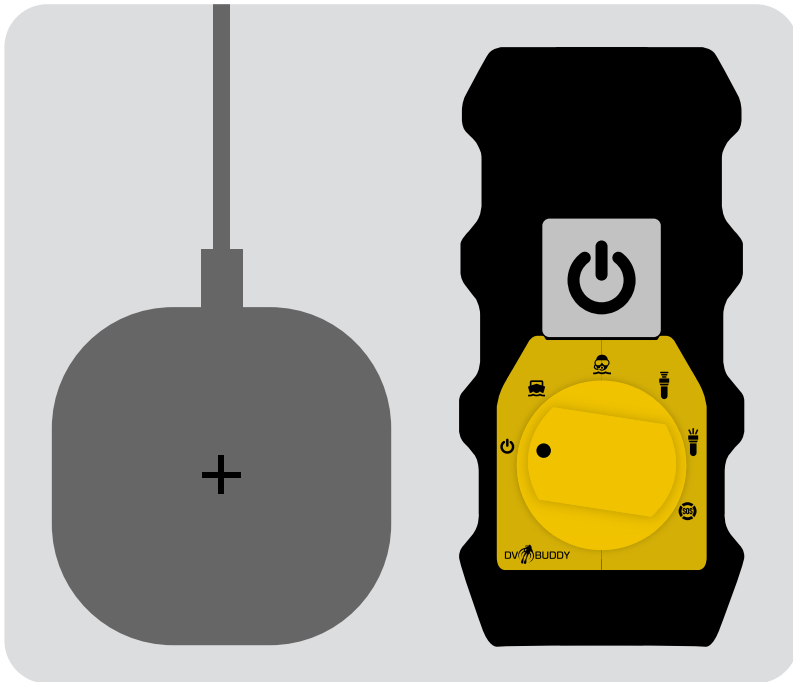




# INITIATION OF SYSTEM

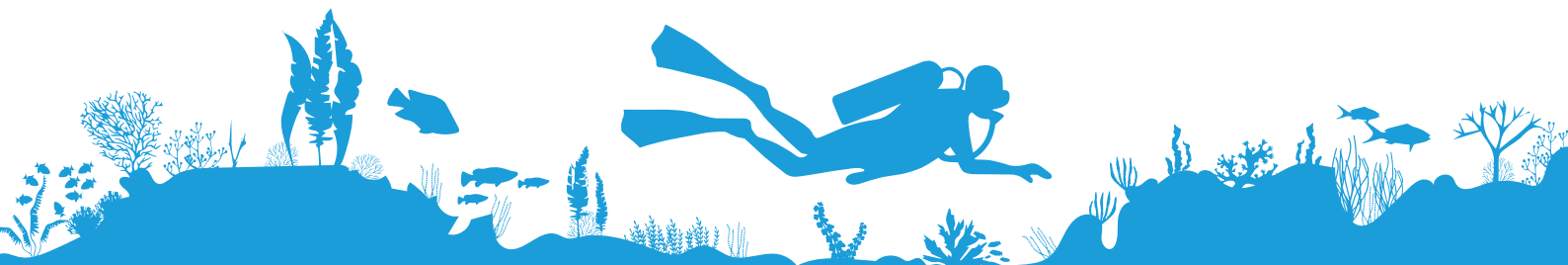
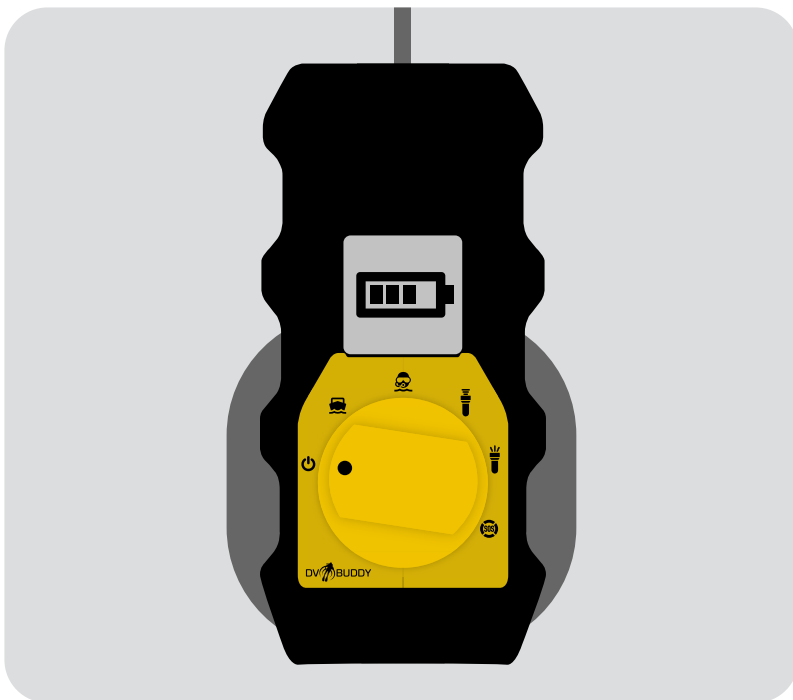
## Diver unit charging

Place the DU on the recommended wireless charger as shown below.

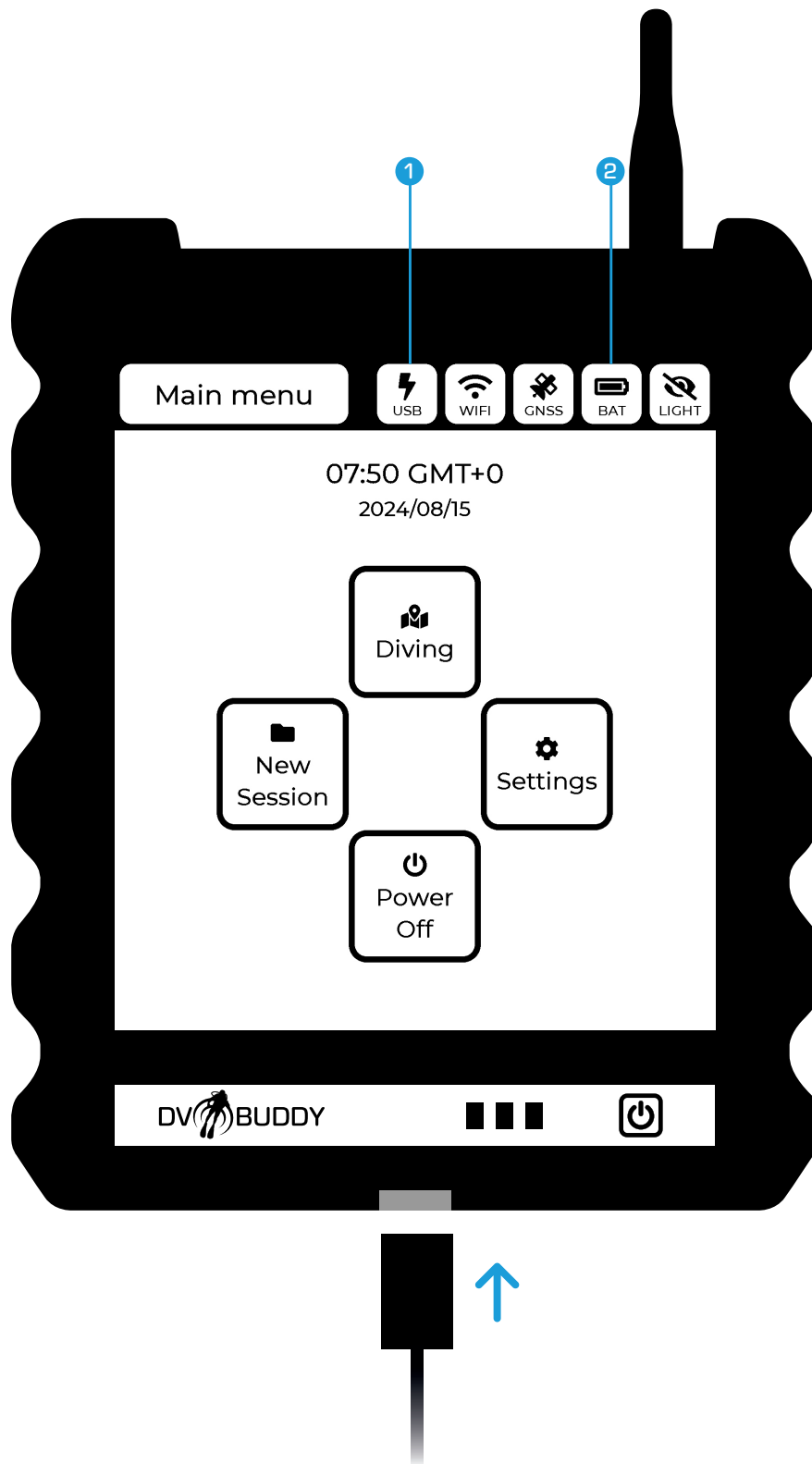


Correct placement and charging of the DU is indicated on the display in 3-5 seconds.

Wait till battery is fully charged – this might take couple of hours (max 6).



# INITIATION OF SYSTEM



## Charging

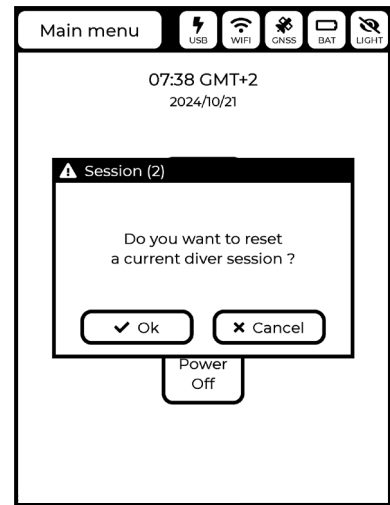
- 1 BU Charging**  
Attach USB-C connector into device and wait till BU fully charged [3-4 hours]
- 2 Check the battery status**  
up to full charge

# INITIATION OF SYSTEM



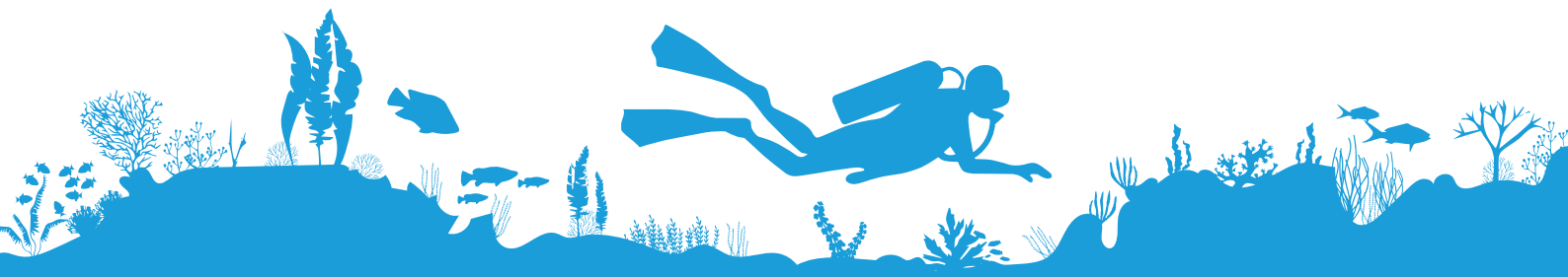
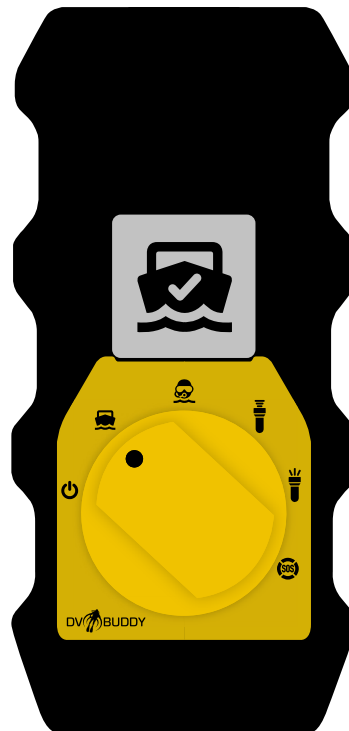
## Boat Unit Operation

- ✓ Press **“Switch On”** and wait until **“Main Menu”** appears on display
- ✓ Press **“New session”** to initiate New dive session. This operation will delete all information from previous session (list and status of divers registered. In case previous session still live then system will ask you to confirm session can be closed or not.)
- ✓ Press **“Diving”** - empty list of divers appears on display



## Dive Unit Operation

- ✓ Switch to the position **“Registration/Deregistration”** and bring DU closer to BU (about 1 m)



# INITIATION OF SYSTEM



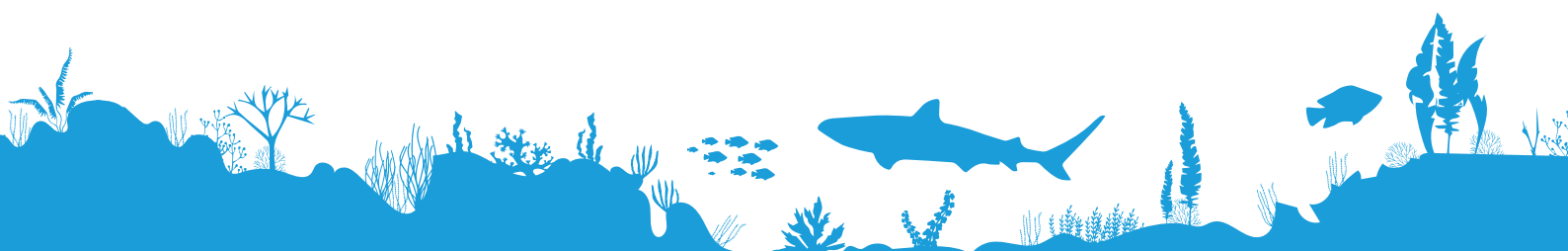
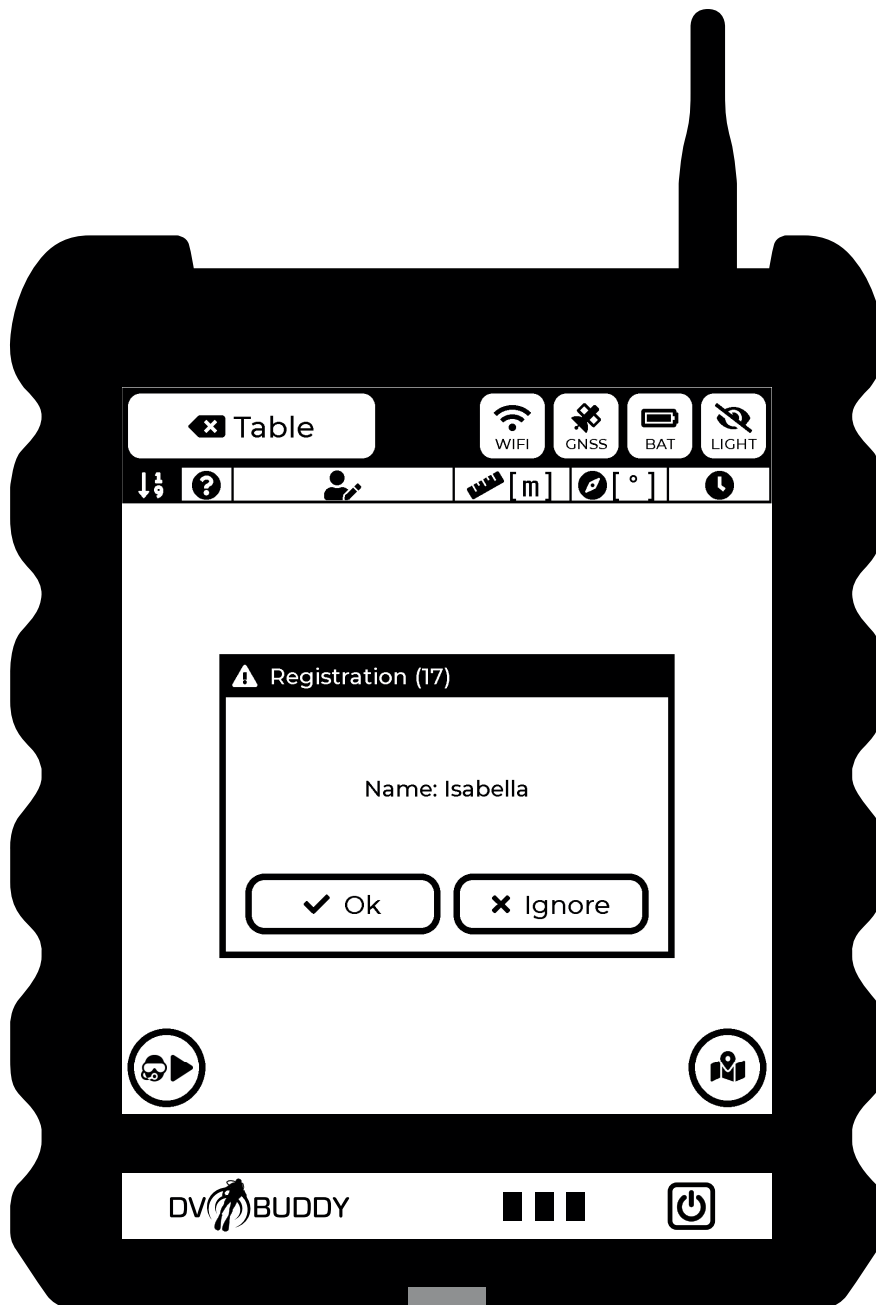
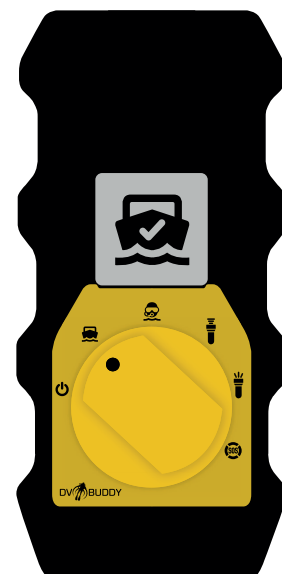
## Boat Unit

- ✓ Request to Add a new diver onto session appears on display. Before you Register new diver check battery status information! Don't register DU with level below 25%!

⚠ Registration (15)

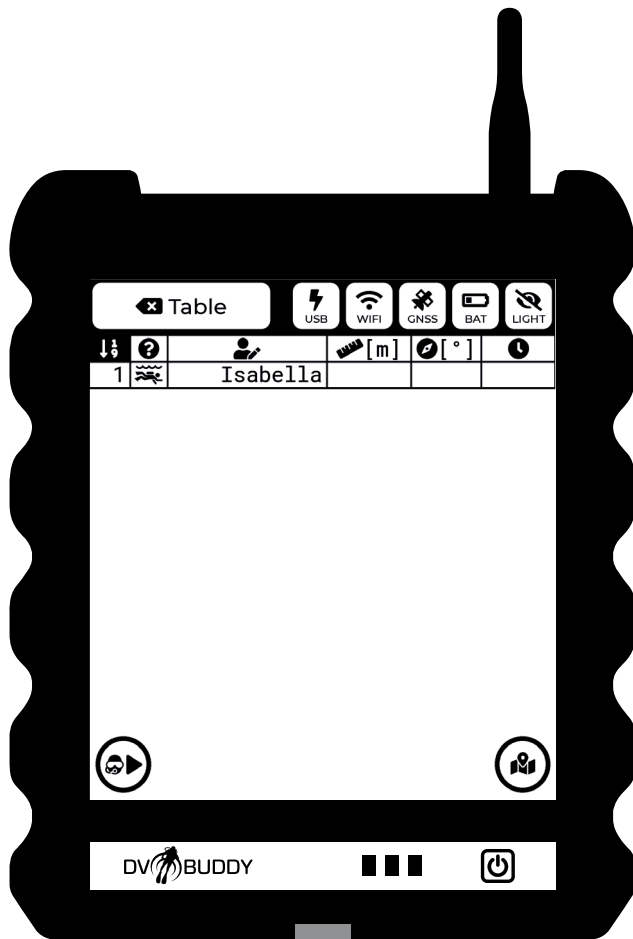
Name: Alexander  
Low battery: 30%

✓ Ok    ✗ Ignore



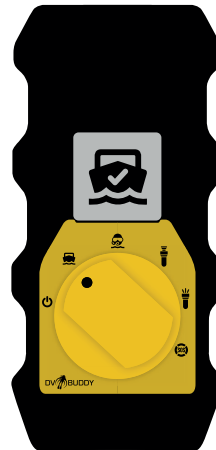


# INITIATION OF SYSTEM

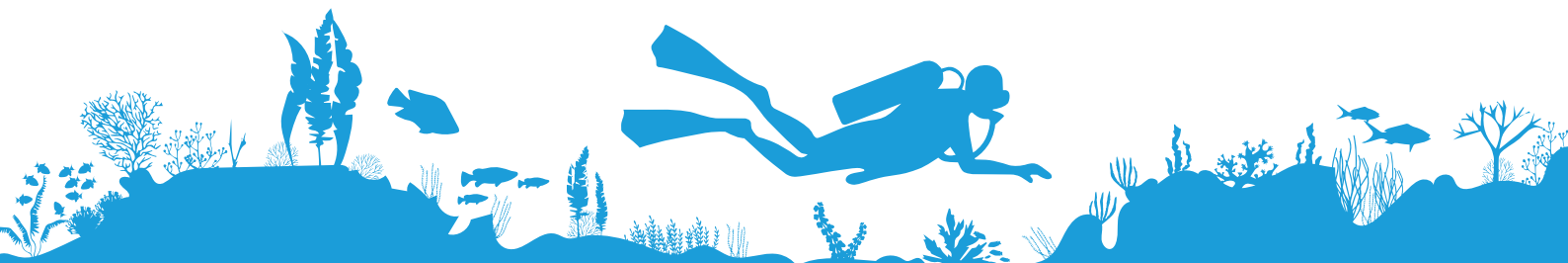


- ✓ New diver [DU] will appear in BU Table with status “diving”

↓ 1/9	?	
1		Isabella



- ✓ Continue adding divers according to the information on the display
- ✓ Divers attach the BU to the carabiner and begins the dive



# INITIATION OF SYSTEM

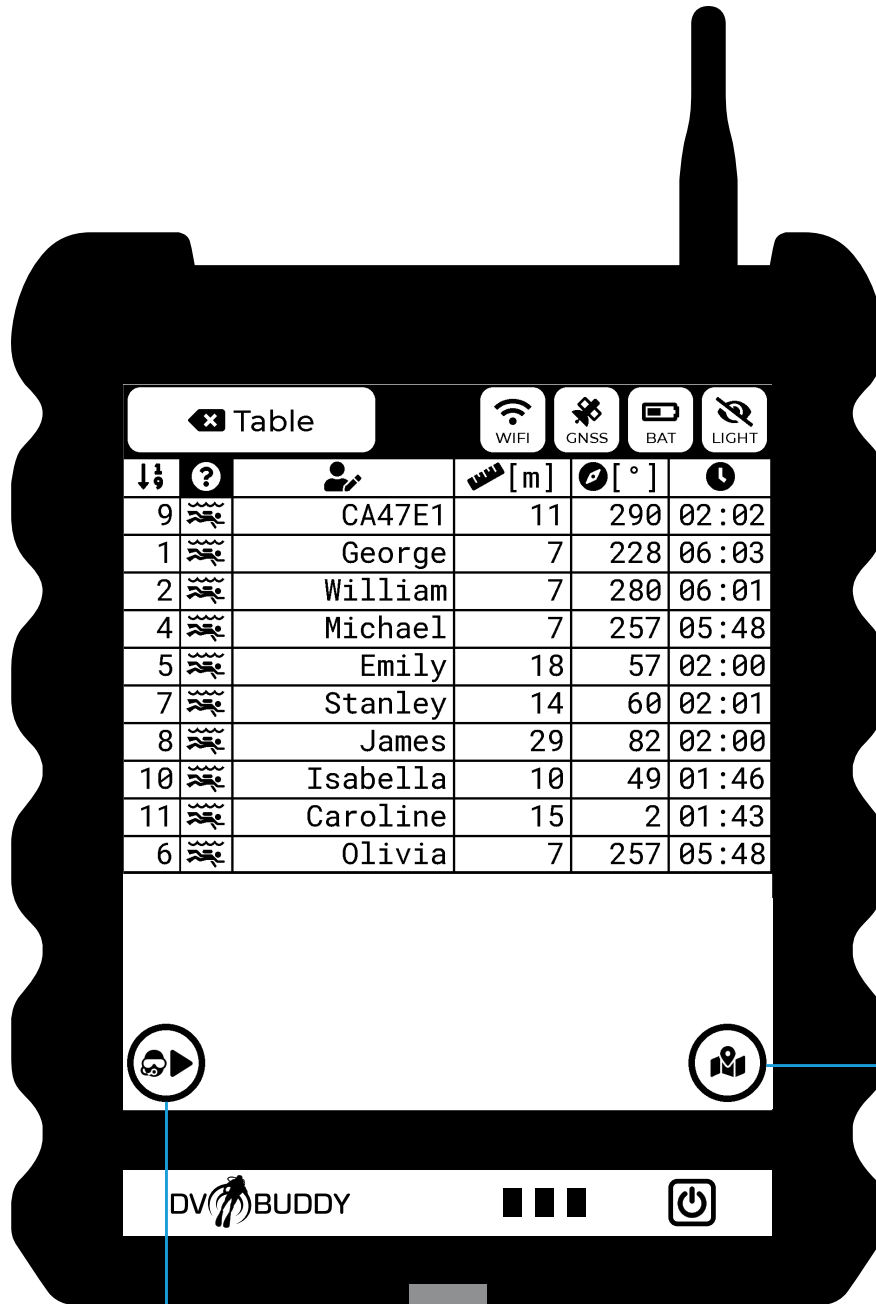
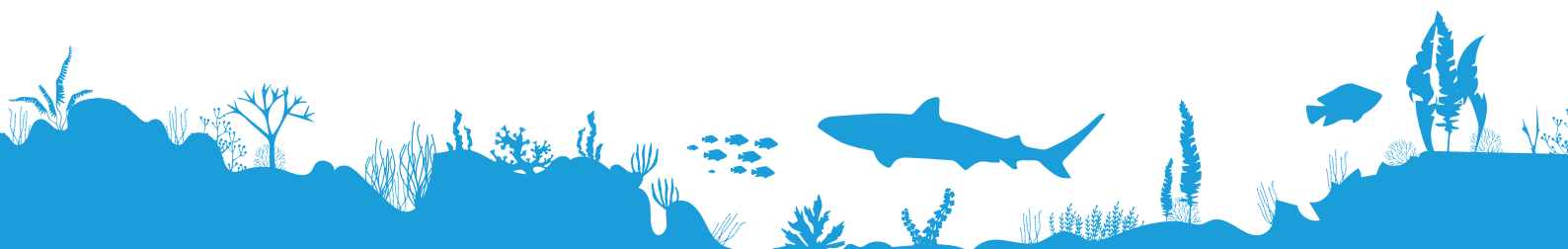


Table / Map

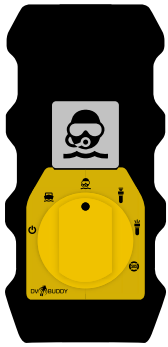
- ✓ Showing list of divers in table or their position on the map

Start diving

- ✓ Once all divers in the water Press „Start diving“ to initiate BU onto localisation mode



# INITIATION OF SYSTEM



- ✓ After dive completed and diver on the surface DU in position Pick up.

BU receives DU request for pick up












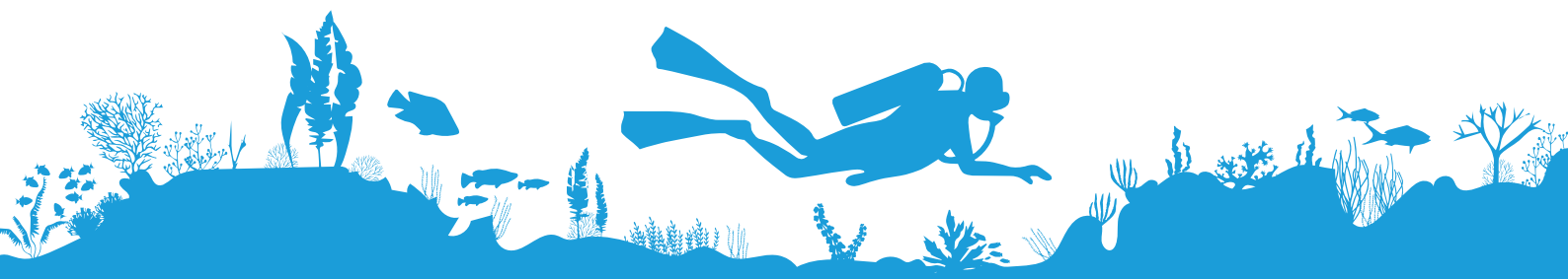
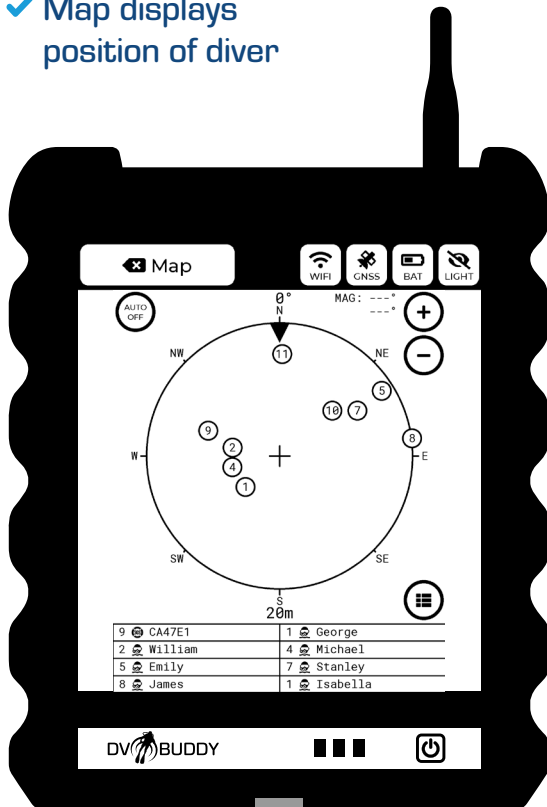
- ✓ Indicate by horn
- ✓ Icon in table will change to 
- ✓ Distance and time will appear in table
- ✓ Map displays position of diver

Table		WIFI		GNSS		BAT		LIGHT	
↓	?		[m]	[°]					
9		CA47E1	11	290	02:02				
1		George	7	228	06:03				
2		William	7	280	06:01				
4		Michael	7	257	05:48				
5		Emily	18	57	02:00				
7		Stanley	14	60	02:01				
8		James	29	82	02:00				
10		Isabella	10	49	01:46				
11		Caroline	15	2	01:43				
6		Olivia							

## Boat Unit

- ✓ Distance, azimuth of divers on the surface displayed on the BU map. The map allows for selecting various scales from 20 meters up to 10 kilometers.

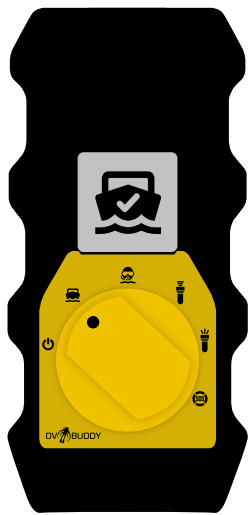


# INITIATION OF SYSTEM

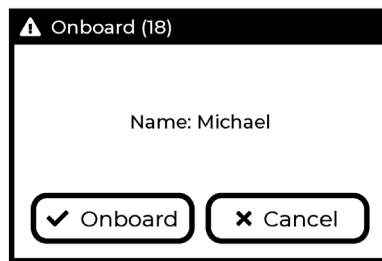


## Diver on the boat / deregistration







- ✓ After the diver is picked up by the boat and is on board, the diver switches the DU to the Deregistration position **1**. The Onboard confirmation window appears **2**. By confirming, the diver's status will change to Onboard **3**.



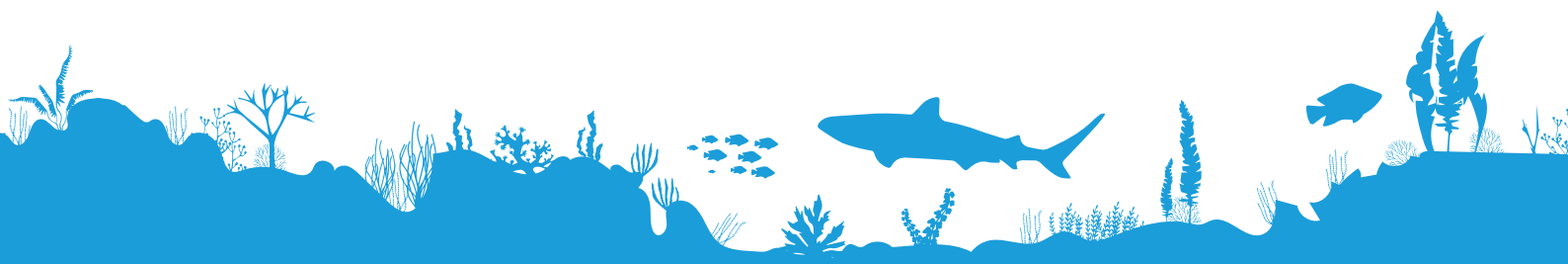
1



2

Table		USB	WIFI	GNSS	BAT	LIGHT
↓↑	?		 [m]	 [°]		
2		Alexander			00:07	
1		Isabella				

3





# INITIATION OF SYSTEM

## Re-registration DU under the same session

- ✓ There is the way how to again register already successfully deregistered DU to the same Dive session

### 1. Delete DU from active Session

Select and touch the line with Diver be deregistered

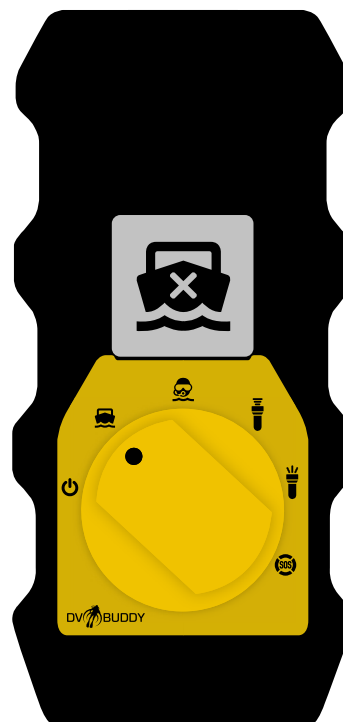
Table		USB	WIFI	GNSS	BAT	LIGHT
↓	?		[m]	[°]		
2		Alexander				00:07
1		Isabella				

### Confirm deletion

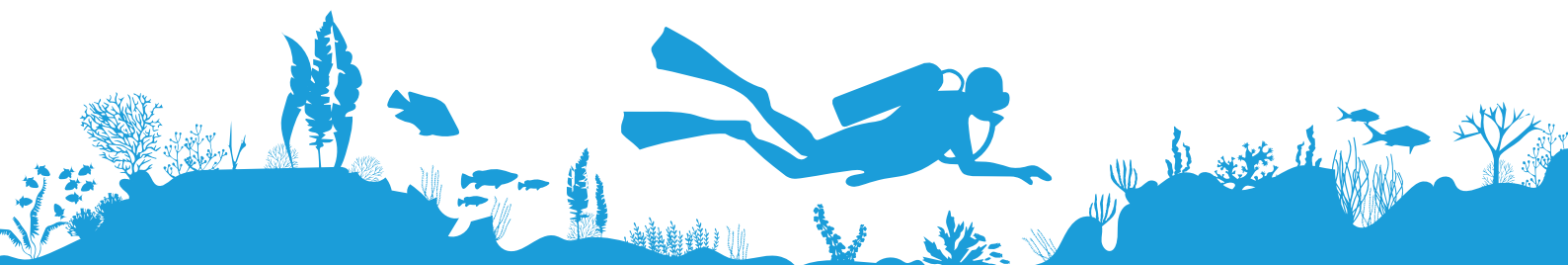
⚠ Isabella (2)

Do you want to delete this diver?

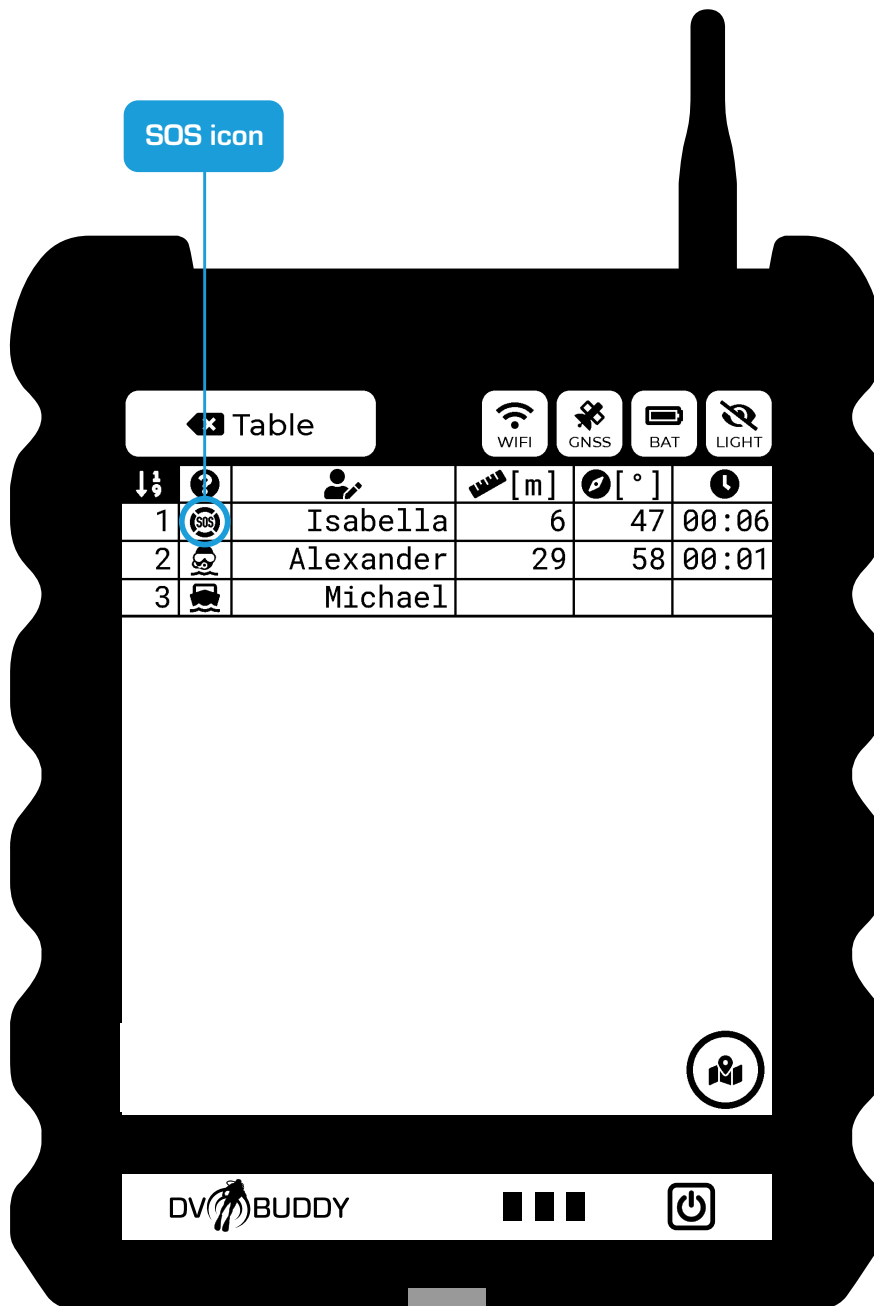
✓ Delete    ✕ Cancel



2. Switch DU Off and On to registration position
3. Register again DU onto the same session



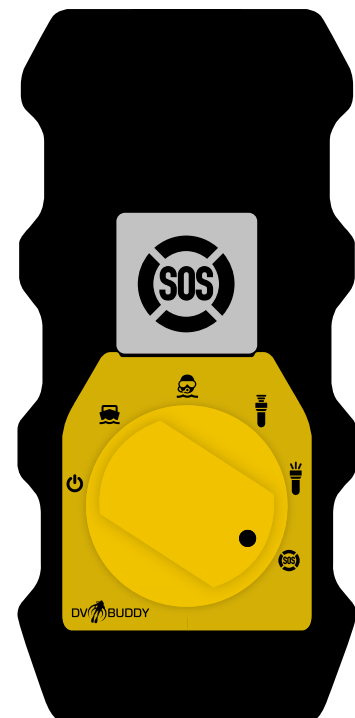
# INITIATION OF SYSTEM



## SOS

- ✓ **SOS urgent request for pick up**

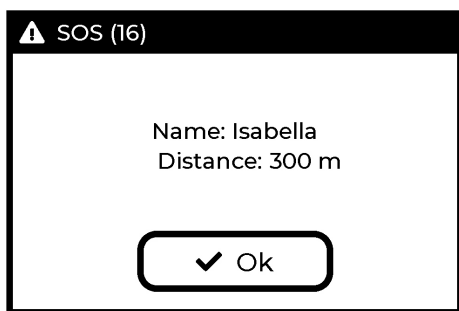
In case of an emergency, the diver switches the DU to the SOS position



# INITIATION OF SYSTEM

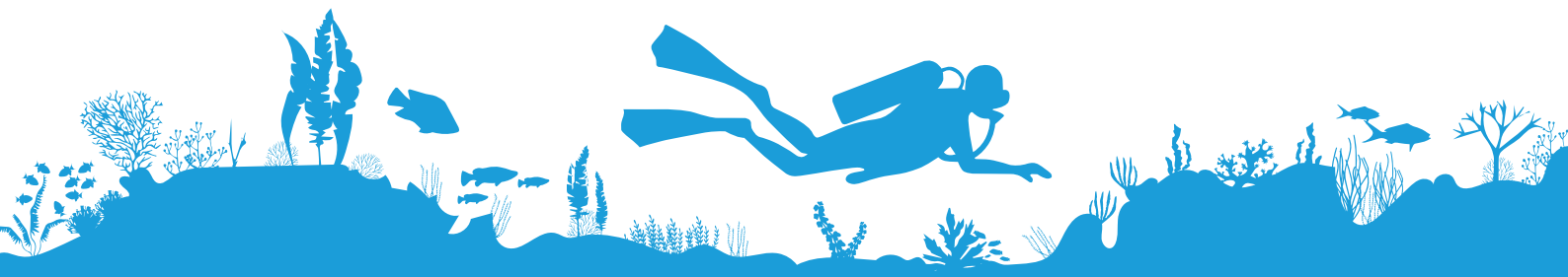
## BU receives DU SOS request

- ✓ Receiving of SOS request is signaled on the BU by horn and notified on the screen. Status of diver is changed to **"SOS"**.
- ✓ In case BU received SOS from none registered BU
  - Emergency message will appear also from DU not registered into session
  - After acceptance **"OK"** new DU appears in table with numeric name



A screenshot of a mobile application interface showing a table of divers. At the top, there is a black header bar with a white "x" icon and the text "Table". Below the header, there are four status icons: WIFI, GNSS, BAT, and LIGHT. Below the status icons, there is a table with five columns. The first column contains a down arrow icon, a question mark icon, and the number "1". The second column contains a diver icon and the name "Isabella". The third column contains a depth icon, the text "[m]", and the number "6". The fourth column contains a compass icon, the text "[°]", and the number "47". The fifth column contains a clock icon and the time "00:06". The first row of the table is highlighted in blue, and the first column has a blue circle with the text "SOS" around the number "1".

↓ ?	🧑	📏 [m]	🧭 [°]	🕒
1 SOS	Isabella	6	47	00:06



# INITIATION OF SYSTEM



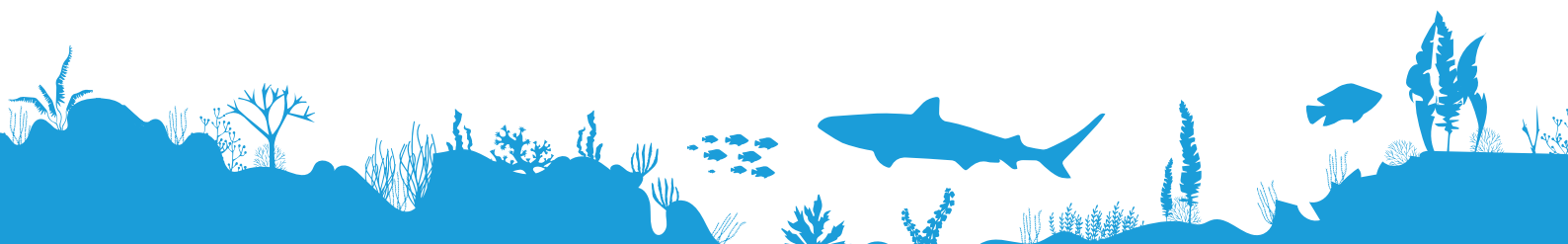
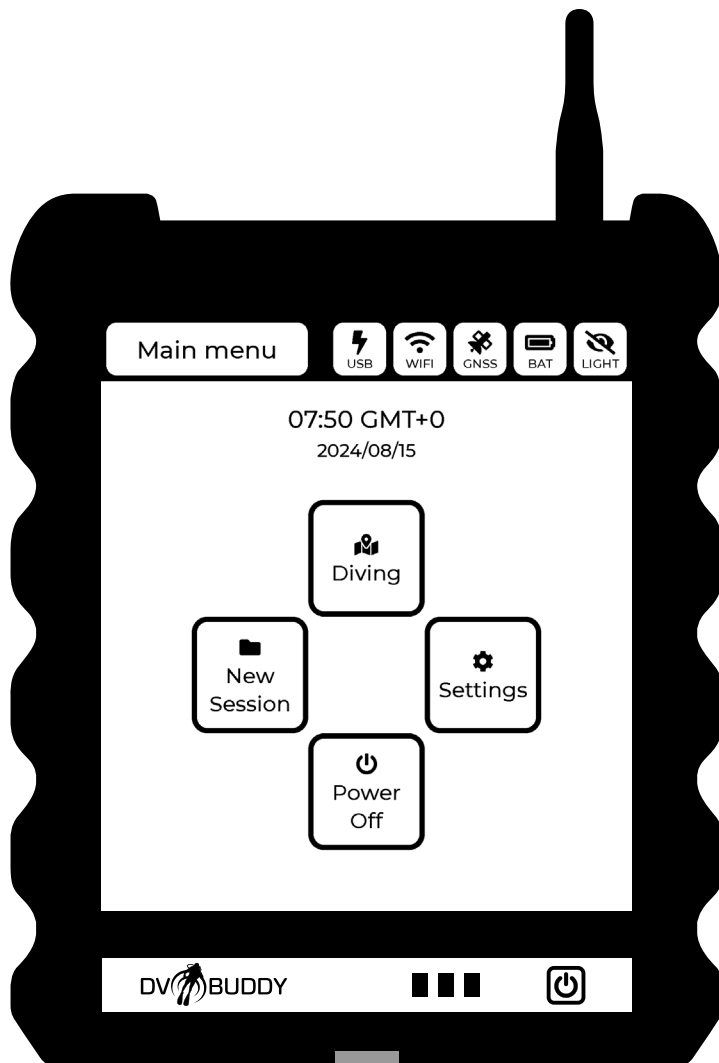
## All divers on boat

- ✓ Be sure that all divers are on the boat and all DU deregistered.

Table						WIFI	GNSS	BAT	LIGHT
↓	?			[m]	[°]				
9		CA47E1		11	290	02:02			
1		George		7	228	06:03			
2		William		7	280	06:01			
4		Michael		7	257	05:48			
5		Emily		18	57	02:00			
7		Stanley		14	60	02:01			
8		James		29	82	02:00			
10		Isabella		10	49	01:46			
11		Caroline		15	2	01:43			
6		Olivia							

## Boat Unit

- ✓ BU switch off:  
Press „Power off“





# TECHNICAL SPECIFICATION



## Diver and Boat Unit


- ✓ LoRa™ transmitter | receiver
- ✓ Communication range up to 10,000 m

Note: The range mainly depends on the height of both the diver's unit and the boat's unit above water level (the higher the units are placed, the longer the range). Typical ranges (Diver unit at least 0.2m above water):

- 3500 m (BU antenna 1.0 m)
- 5000 m (BU antenna 2.0 m)
- 6000 m (BU antenna 3.0 m)
- 8000 m (BU antenna 5.0 m)
- 10,000 m (BU antenna 8.0 m)

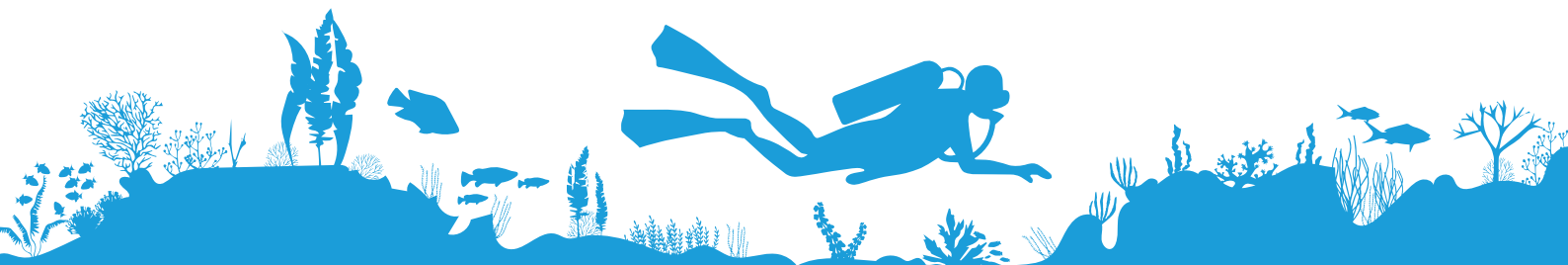
- ✓ The range can also be affected by surrounding conditions (such as very high waves).

## Diver Unit

- ✓ Internal PCB antenna
- ✓ Maximum depth of operation 150 m (492 ft)
- ✓ GPS module
- ✓ E-Ink display 1,54"
- ✓ Bluetooth® 5.1 module
- ✓ Operating temperature  
0 °C to +50 °C (32 °F to +122 °F)
- ✓ Wireless charging 
- ✓ Sensors: depth gauge, accelerometer, gyroscope, compass, temperature
- ✓ Accumulator LiPo 3,7 V | 2200 mAh
- ✓ Integrated
  - light | signal light
  - retractable knife
- ✓ Dimensions
  - Length: 145,9 mm (5,74 in)
  - Width: 72,4 mm (2,85 in)
  - Height: 46,3 mm (1,82 in), 30,6 mm (1,21 in) without rotary switch
- ✓ Weight: 290 g (10,2 oz) neutral under water
- ✓ Battery Life
  - up to 200 hours operating
  - up to 3 months stand-by

## Boat Unit

- ✓ Fixed external tilting antenna
- ✓ IP66
- ✓ GPS module
- ✓ E-Ink display 7,8" with backlight and touch panel
- ✓ Bluetooth® 5.1 module
- ✓ Operating temperature  
0 °C to +50 °C (32 °F to +122 °F)
- ✓ WiFi 802.11 b | g | n module
- ✓ Accumulator LiPo 3,7 V | 4000 mAh
- ✓ USB-C Connector for charging and communication
- ✓ Acoustic siren
- ✓ Dimensions
  - Length: 226,2 mm (8,91 in)
  - Width: 164,1 mm (6,46 in)
  - Height: 21,0 mm (0,83 in)
- ✓ Weight 440 g (15,52 oz)
- ✓ Battery Life
  - up to 8 hours operating
  - up to 3 months stand-by





MAKE SURE  
ALL DIVERS ARE  
ON THE BOAT

