

RADAR-DETECTOR

RD-400

User manual



2016

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öLogiSö's obligation is limited to repairing or replacing parts or equipment which are returned to öLogiSö.

öLOGISö ASSUMES NO LIABILITY FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR INJURIES, CAUSED BY PROPER OR IMPROPER OPERATION OF ITS EQUIPMENT, WHETHER OR NOT DEFECTIVE.

Before returning any equipment to öLogiSö, a Return Material Authorization (RMA) number must be obtained. Please call the öLogiSö Customer Service Manager who will assign an RMA number. Be sure to have the serial number of the unit available.

FCC Class B Compliance

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. this device may not cause harmful interference,
2. this device may accept any interference received, including interference that may cause undesired operation

Warning: changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment or residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if the user uses it not in accordance with the öUser's manualö, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation

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1. General Safety Instructions and Certification

When using the device as intended, it is a bad practice to point its work surface toward people. The level of device radiation power is not detrimental to man's health. The operation safety subject to normal location of the device, i.e. the device is oriented to test medium, is confirmed by sanitary and epidemiological inspection report No. 50.99.04.431. .008785.07.07 of 03.07.2007 of the Directorate of Federal Service for Surveillance in the Sphere of Consumer Rights Protection and Human Wellbeing for Moscow region.



Safety Instructions When Working with BP-9/12 Power Supply Unit:

- Do not use and do not charge the power supply unit with damage symptoms: deformation, leakage of the battery electrolyte.
- Do not open the power supply unit.
- Do not immerse the power supply unit into water.
- Charge the power supply unit only with dedicated charging unit.

To avoid injury and device damage, observe the following precautions:

Avoid slamming and mechanical damages during device use and transportation.

Only trained personnel and the one familiar with Operation Manual is allowed to operate the device.

Maintenance procedures of the device can be performed only by skilled personnel.

Partial or complete disassembly of device is prohibited to avoid electric shock.

Avoid contacting bare spots of wiring when operating the device. Do not touch uninsulated connections and live components.

Do not repair the device by yourself to prevent its damage.

It is prohibited to immerse the devices or its parts into water or other fluids.

2. Purpose

Radar Detector (RD-400) is portable radio detection system designed to locate survivors buried under rubble or debris by either movement or breathing.

3. Set of RD-400 Radar-Detector

The RD-400 set consists of:

1. RD-400 Radar Detector
2. BP-9-12 power supply unit
3. ZU-9 charger
4. Rugged tablet PC
5. Charger for tablet PC
6. Radio modem unit
7. Documentation (Operation Manual, Certificate)
8. GeoScan32 software, base version (installation CD).

Outside view of RD-400 radar detection device is shown in Fig. 3.1.

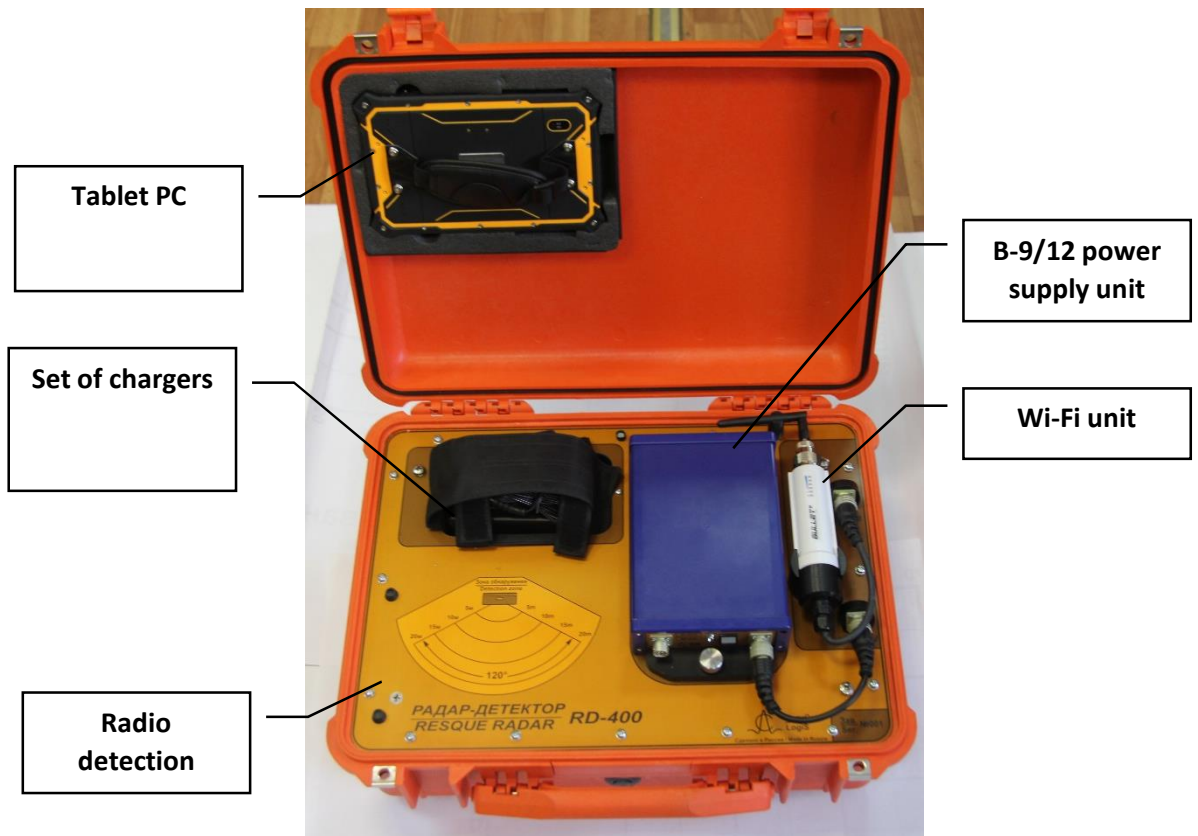



Figure 3.1. RD-400 Radar-Detector

4. Preparation and sounding

The operation and selection of sounding parameters of the device is controlled by the software installed in tablet PC included in the device set. Transition of control commands, data exchange between RD-400 and tablet PC is carried out via WI-Fi channel, which automatically switches on at RD-400 power up, and in the tablet PC ó after the program start-up.

Operation procedure of RD-400 radio detection device:

1. Switch on power supply by pressing the button of BP-9-12 power supply unit to ðOnö position.
2. Place the radio detection device on the surface of a medium to be analyzed. Emission of sounding radio signals is pointed toward the case bottom (the side opposite to cover of the case) having protective rubber legs.
3. Switch on tablet PC. Select tag  on the PC Desktop and tap on it twice with your finger.

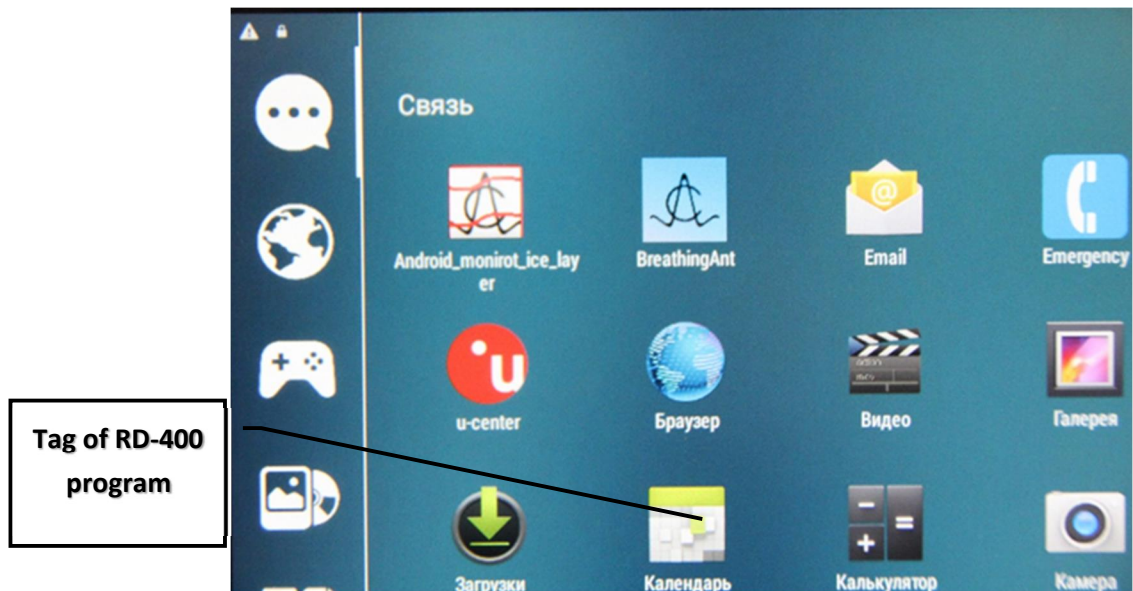


Figure 4.1. Icon of RD-400 control program on the PC Desktop

- Window shown in Figure 4.2 will display on screen of tablet PC after the program start. The "Search of AB" caption appearing at first moment means the process of establishment of connection between RD-400 and tablet PC; the caption goes out when connection is established.

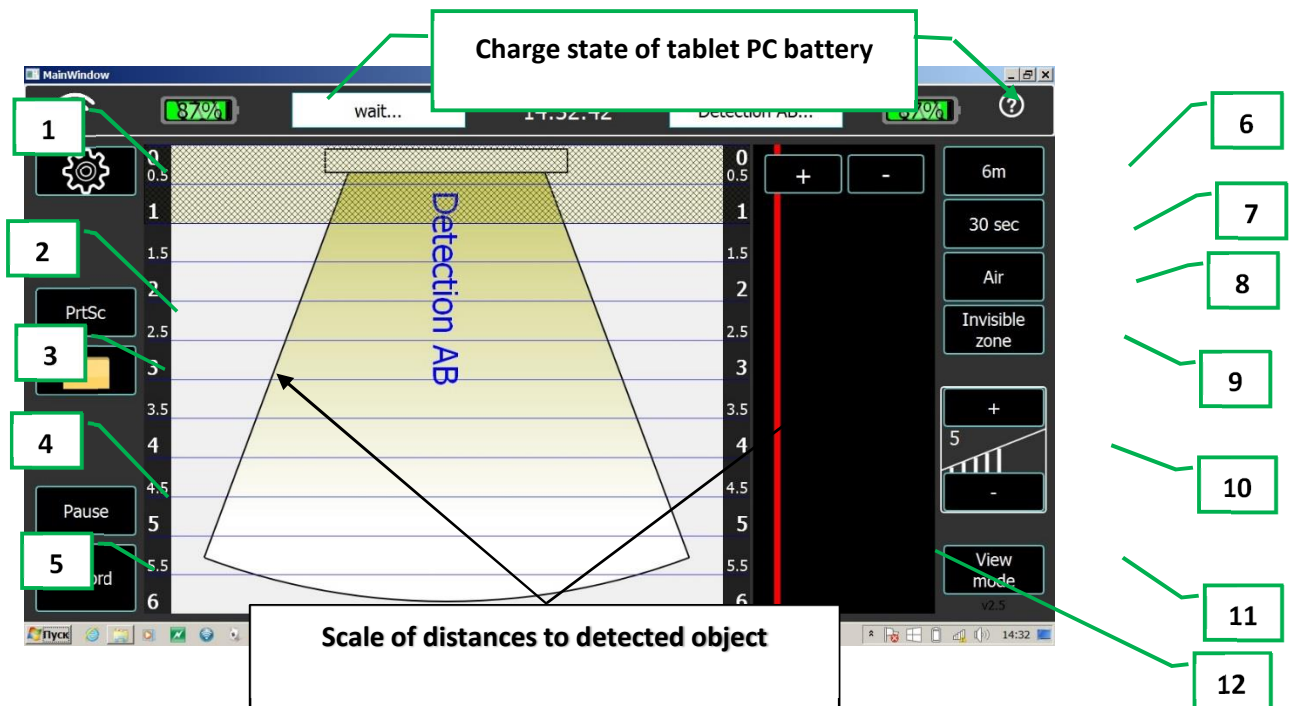


Figure 4.2. Main window of radio detector device program

Assignment of control buttons of main window of RD-400 control program

- selection and adjustment of sounding parameters;
- saving of tablet PC screen image;
- folder with saved files of soundings and screenshots;
- temporal suspension of image on the screen;
- actuation of the sounding results saving mode;

6. selection of sounding distance;
 7. selection of time span for reflected signals spectrum analysis;
 8. selection of sounding medium;
 9. setting of distance at which detection of objects does not take place;
 10. change of device sensitivity;
 11. selection of a form of mapping of sounding results on the screen;
 12. zone of the reflected signal spectrum presentation.
5. Further, the radio detector device switches over to data analysis mode (Figure 4.3). Zone of the reflected signal spectrum presentation goes into the analysis time indication mode, and the filling time of this zone corresponds to the time of analysis. There is an additional caption, which shows up in the same zone: «Please wait. Data under acquisition»

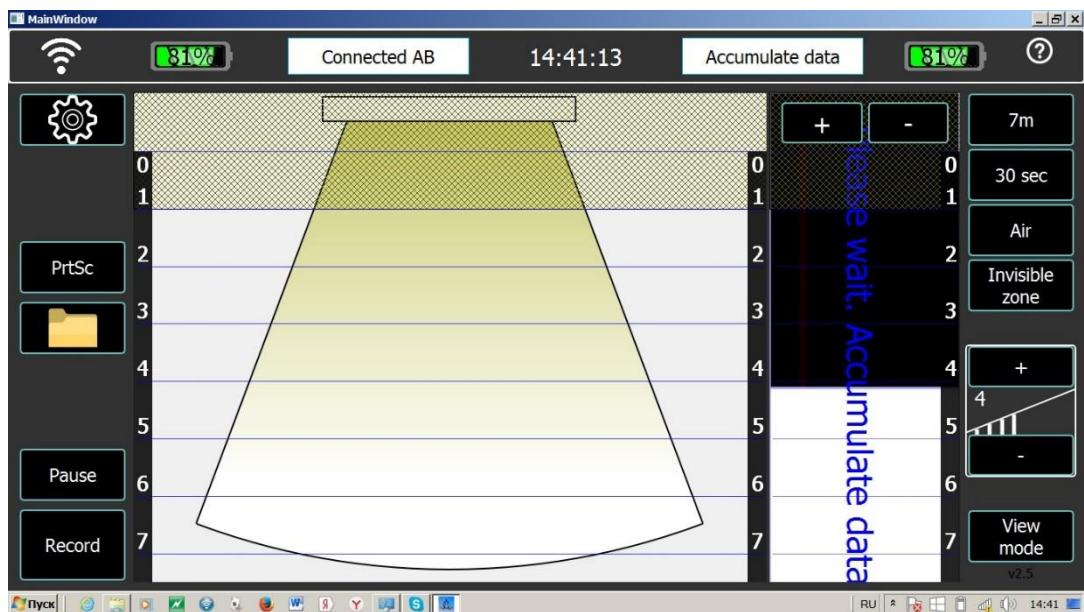


Figure 4.3. Main window of radio detector device program

After data analysis, in case of the object detection by its breathing the program window will be as shown in Figure 4.4. Cryptogram with the image of a man appears on the screen supplied with distance to object detected by its breathing. Additionally the spectrum of reflected signal from the object detected by its breathing and position of hardware threshold of the device (red line) starts displaying in the right side of the main window. The form of spectrum of reflected signal extends the operator's capabilities in forecasting and estimating the situation on the likely presence of breathing object under the obstruction. Appearance of a pronounced peak in the spectrum refers to the object detection by its breathing. Moving the line that corresponds to the hardware threshold using «+» and «-» buttons allows to set up most comfortably the size of spectrum of reflected signal.

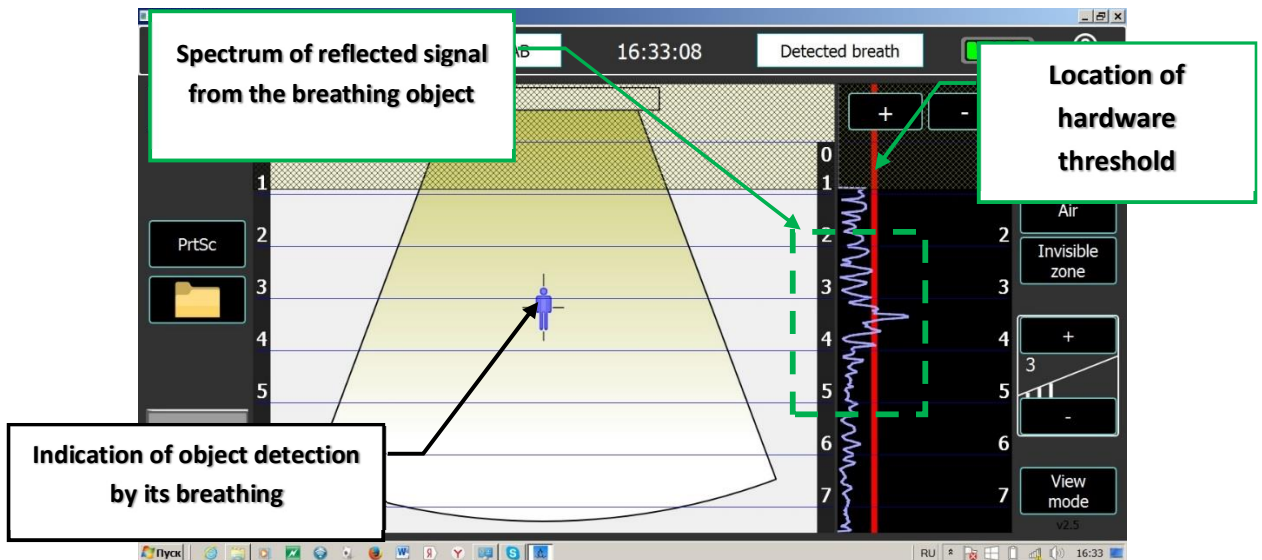


Figure 4.4. View of window of radio detection device program in case of living object detection by its breathing

Apart from the view seen in Figure 4.4, the RD-400 program displays the results of sounding as shown in Figure 4.5, which is switched over by "Change view" button (Figure 4.2, item 11). Radargram is displayed in the left part of the screen.

In case of the object detection by its breathing, a blue line located relative to the scale of distances according to the distance from the radio detection device to the detected object is drawn on the radargram.

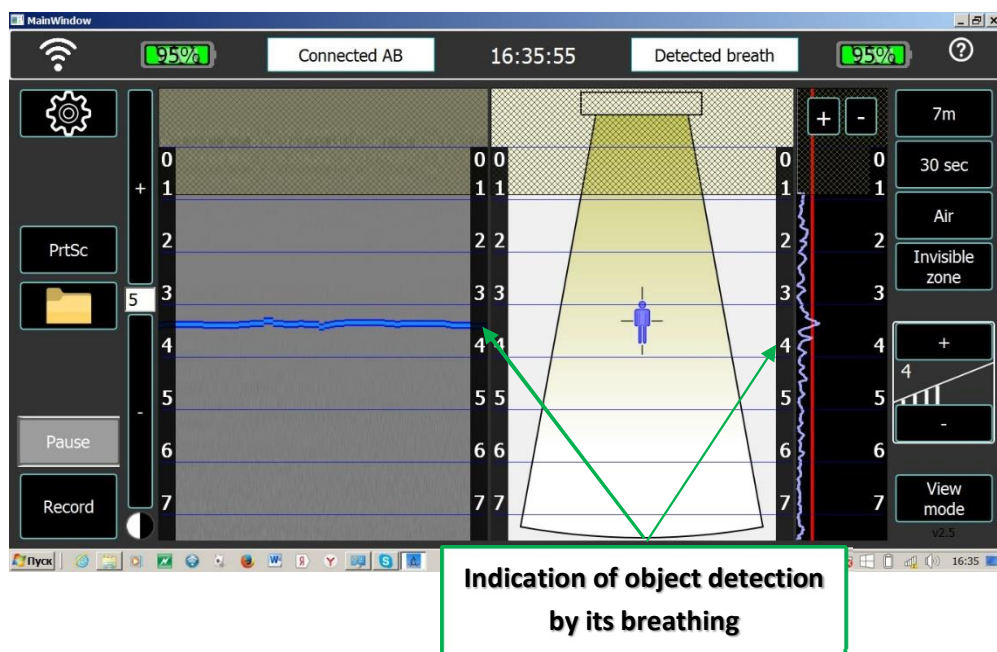


Figure 4.5. View of window of radio detector device program with display of radargram and graphical image at detection of living object by its breathing

To enhance efficiency of RD-400 radio detector device application, the program provides a series of options, which function and use are described below. Calling up of required option is performed

by pressing of relevant button.

Settings option (Figure 4.6) allows:

- selecting the language (English, Chinese) of captions in main window of RD-400 program.
- configure settings of device manufacturer (Factory settings).

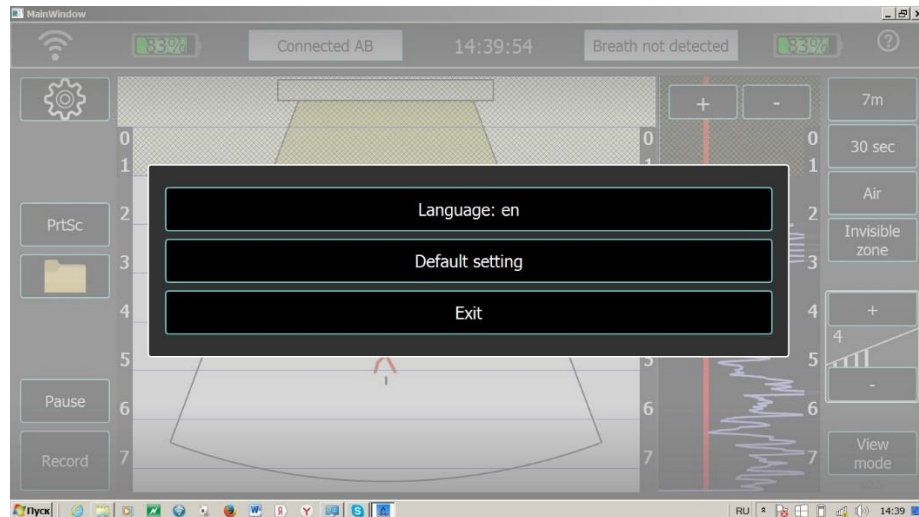


Figure 4.6. Settings menu of RD-400 radio detector device program

Distance option - meant for selection of sounding distance of RD-400 radio detection device (3 m, 7 m, 15 m, and 30 m) Figure 4.7.

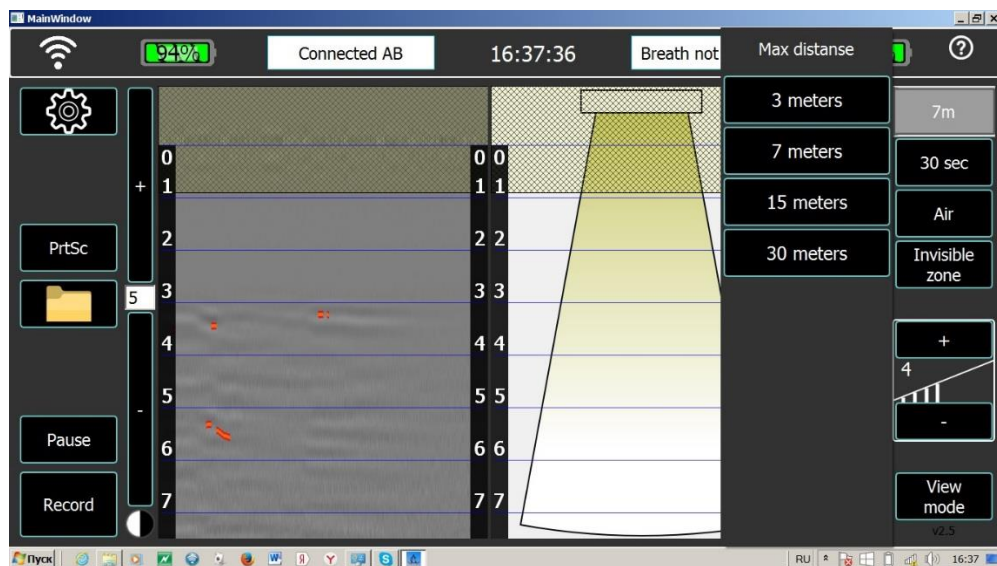


Figure 4.7. Distance option of RD-400 radio detection device program

Time of analysis option - meant to set up time period (Figure 4.8), during which the program analyses spectrum of reflected signals. Range of analysis time variation is 15, 30, 60, and 120 s. In the course of prospecting works under rough conditions, it is necessary to increase the time of analysis to 60-120 s.

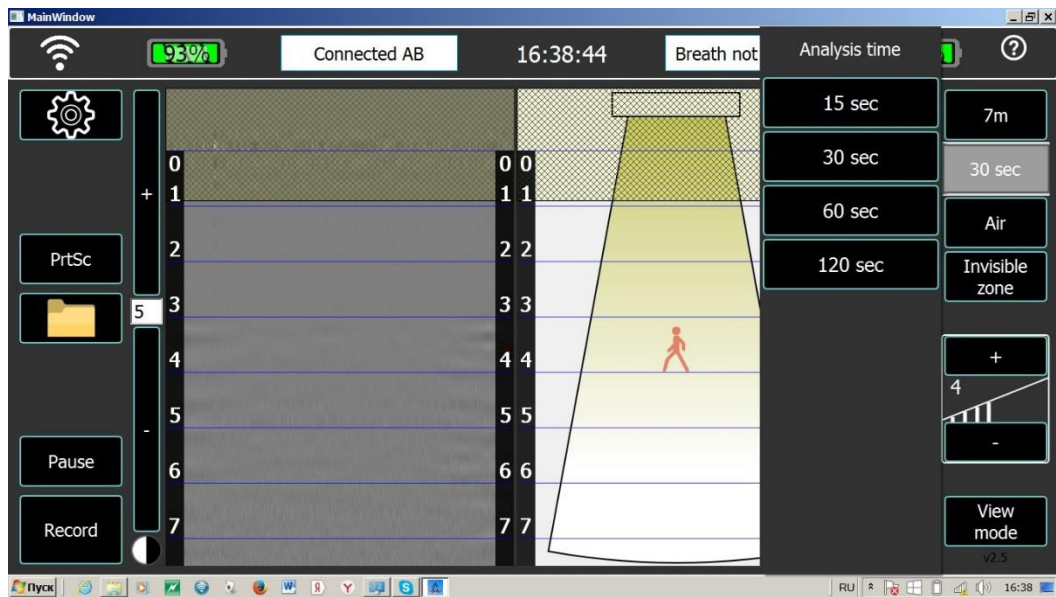


Figure 4.8. Time of analysis option of RD-400 radio detection device program

Blind zone option - meant to adjust distance value (Figure 4.9) in a close zone of device in order to decrease probability of false detections. The size of Blind zone changes to a distance of 1.0 m with a step of 10 cm, further on the step of change is 0.5 m. The main program window area of Blind zone gets filled with green transparent color.

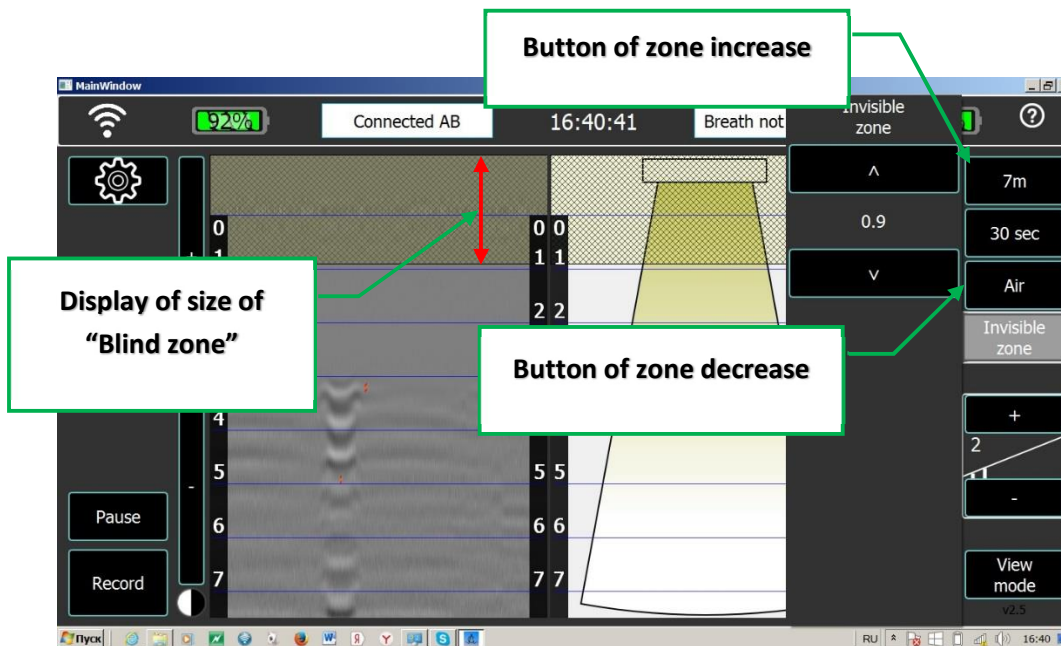


Figure 4.9. Blind zone option of RD-400 radio detection device program

Sensitivity option - meant to change the device sensitivity (Figure 4.10) at detection of objects by their breathing. There are eight grades of sensitivity in the program from 1 to 8; 8 stands for the highest sensitivity. Button + increases sensitivity of the device, and button - decreases it; additionally a numeric value displays the grade of sensitivity. Increase of sensitivity at sounding of medium which is not complex by its electrophysical properties leads to rise of false random

detections.

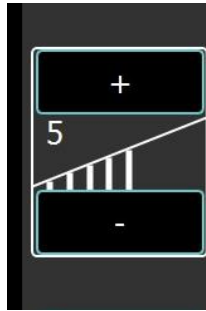


Figure 4.10. Sensitivity option of RD-400 radio detection device program

Medium option - is selected (Figure 4.11) depending on nature of medium, which the sounding penetrates (concrete, air, snow). Selection of medium affects the correctness of determination of a distance from the radio detection device to an object detected by its breathing

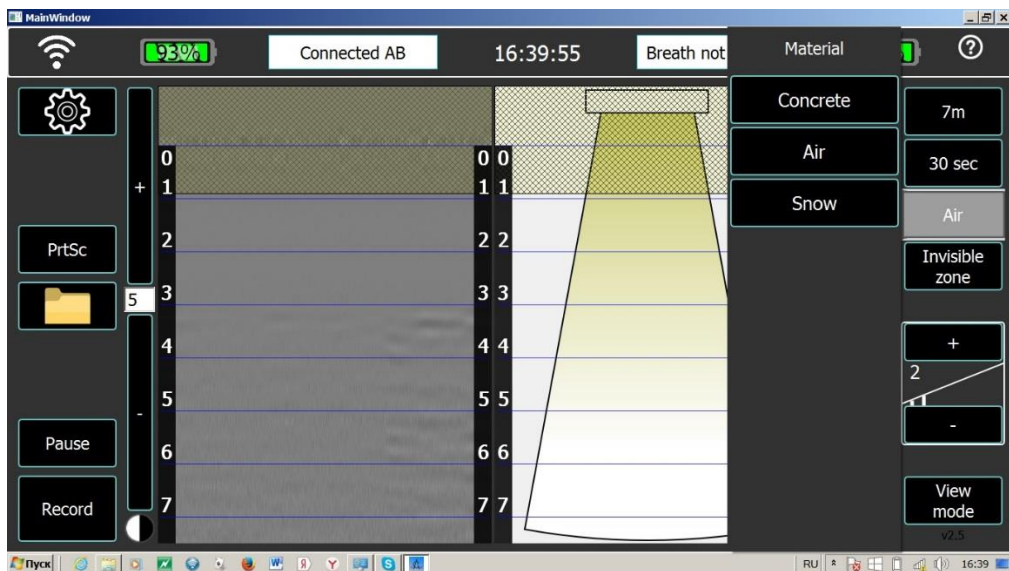


Figure 4.11. Medium option of RD-400 radio detection device program

RD-400 radio detection device detects the objects not only by their breathing, but also by their motion. The window of device program can be presented in two forms (Figures 4-12 to 4.13). In the first case, detection of a mobile object is displayed in the form of the walking manöcryptogram, which moves on the screen in parallel to the scale of distances depending on change of distance from the device to the detected moving object. In the second case, radargram is supplemented, on which the motion trajectory of detected object moves relative to the device.

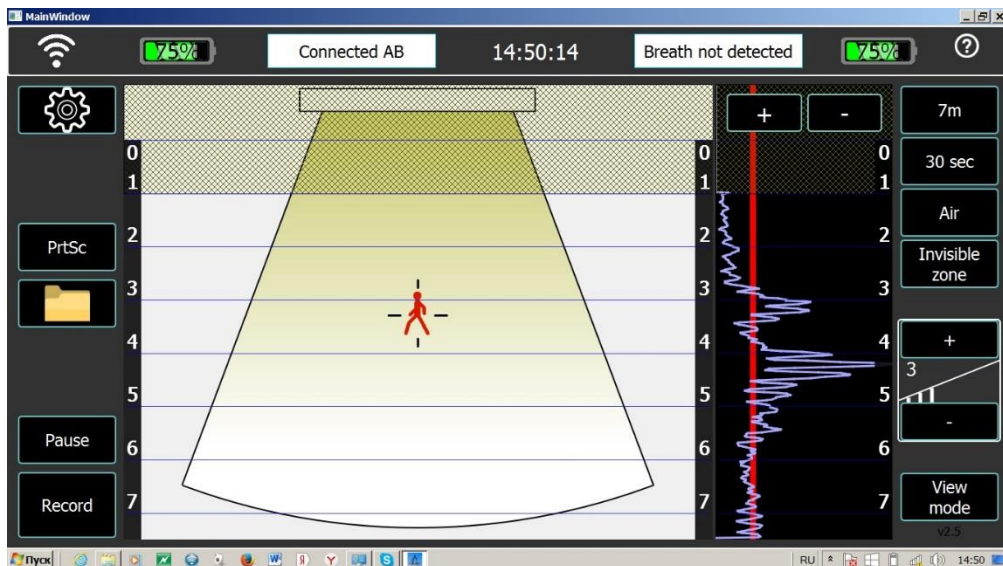


Figure 4.12. View of window of radio detection device program with display of results in the form of a moving object

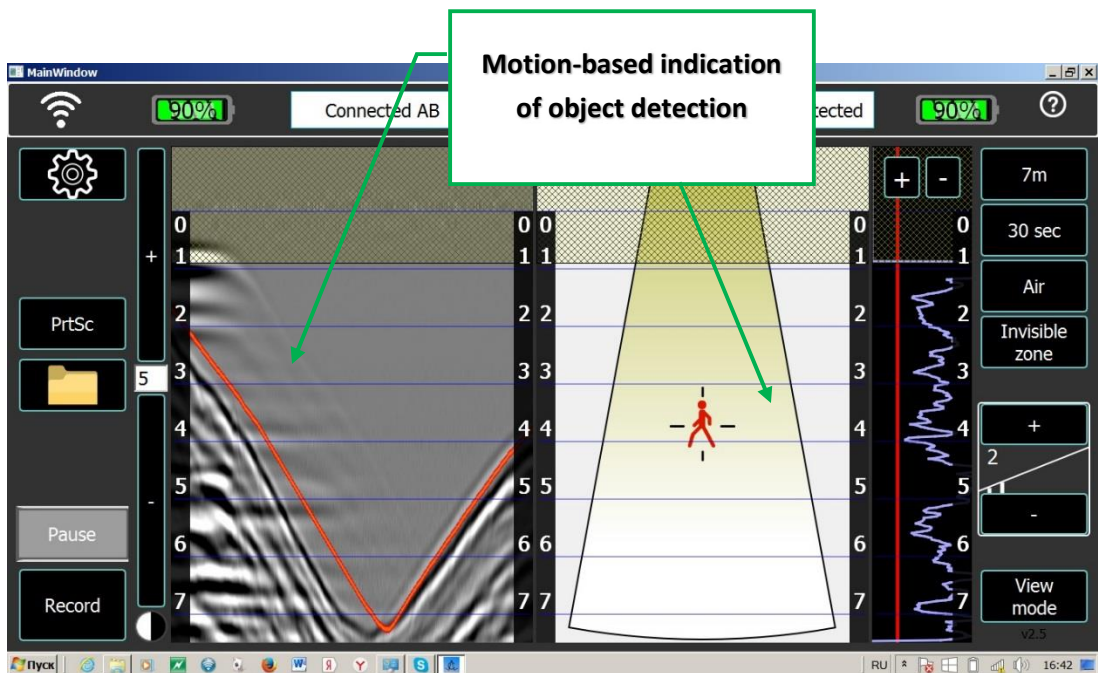


Figure 4.13. View of window of radio detection device program with display of results in graphical mode and radargram at motion-based detection of a living object

5. Charging the power supply unit

Before start of the charging procedure, it is necessary to unplug connector (item 1 Figure 4.1) from the power supply unit.

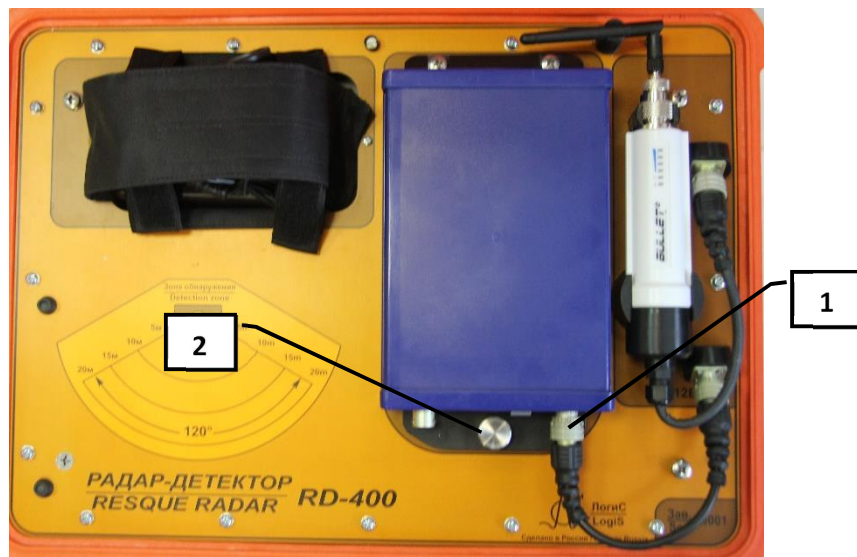


Figure 5.1. Upper panel of RD-400 radio detection device

Sequence of BP-9/12 power supply unit charging:

1. Connect ZU-9 charger to 220V, 50Hz mains.
2. Switch on power supply unit.
3. Connect charger to the power supply unit.
4. Prior to charging, the red LED flashes (test phase) over 2-3 seconds, then it stays lit. Charging of completely discharged power supply unit takes not more than 10 hours.
5. When green LED lights up, disconnect the charger and power supply unit in reverse order.

If it is necessary to completely disconnect BP-9/12 power supply unit from the radio detection device, perform the following steps:

1. Disconnect the connector, item 1 (Figure 4.1)
2. Unscrew the screw, item 2 (Figure 4.1).