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“ALADDIN” STRUCTURE KIT

USER MANUAL



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User Manual

Pisa, 12/02/2010

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1999/05/EEC Radio Directive

Warning: this equipment is destined for use in industrial environments (Class A apparatus). In residential, commercial and light industry environments, this apparatus may generate radio interference: in this case, the user may be required to operate while taking appropriate countermeasures.

The apparatus is sensitive to the presence of external electromagnetic fields, which may reduce its performance.



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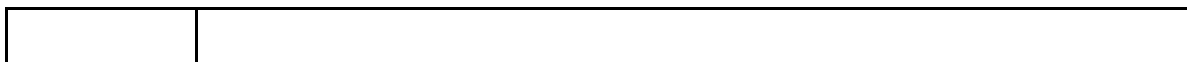
CLEANING INFORMATION

Before cleaning any external parts of the apparatus, make sure that all cables have been disconnected, including the power supply cable. If a damp cloth is used, make sure it is not too wet, to avoid any damage to the electrical components of the equipment. Wait until the equipment is totally dry before reconnecting the cables.

The system should be cleaned periodically using a damp cloth.

Do not use solvents or abrasive detergents.

Do not apply liquid directly to the electrical contacts of the various connectors. If a specific spray is used to clean the PC TFT monitor, make sure it is not flammable; in any case, do not spray it directly on the screen, instead, spray it onto the cleaning cloth.





BATTERIES REMOVAL INFORMATION

Laptop Batteries:

Manufacturer: PANASONIC

Type: Li-ion Ni

Characteristics: 10.65V 5.7Ah

Removal instructions:

1. turn off the laptop;
2. open the drawer with the symbol of the batteries;
3. extract the battery pack pulling the tab.

Radar batteries:

Manufacturer: FIAMM FG21202 / SAFT MP176065

Type: rechargeable lead acid / rechargeable lithium-ion

Characteristics: 12V & 12Ah / 15V & 6.8Ah

Removal instructions:

1. disconnect the battery from the instrument:
 - a. pull the connector wings;
 - b. separate the connectors;
2. remove the battery from the cover (optional) opening the strap.



RECICLYING

The crossed out wheeled bin symbol shown on the equipment indicates that the product must be recycled separately from other waste at the end of its useful life.

Separate waste disposal of this product at the end of its useful life will be organised and managed by IDS. When you decide to dispose of the equipment, contact IDS and follow the system that IDS has set up to permit the separate collection of the apparatus at its life end.

Adequate separate collection for its subsequent recycling, treatment and environmental friendly disposal contribute towards avoiding any unnecessary effects on the environment and to health and favour the reuse or recycling of the materials that make up the equipment. Unauthorised disposal of this product as unsorted waste by its possessor will lead to an administrative penalty foreseen by national regulations.

WARRANTY CERTIFICATE CONDITIONS

- 1) IDS Ingegneria dei Sistemi S.p.A, hereinafter referred to as IDS, warrants hardware/software products for a period of 12 months from the delivery date to the original customer;
- 2) The delivery date is certified by the "Warranty Registration Form";
- 3) IDS's hardware products will be free from defects in materials workmanship under normal use and service;
- 4) IDS's obligation is limited to repairing or replacing parts or equipment which are returned to IDS, without alteration or further damage, and which in IDS's judgment, were defective or became defective during normal use;
- 5) IDS' software will have to be installed on a PC according to the requirement of the IDS hardware (see IDS User's Guide the Software Data Acquisition);
- 6) IDS's software products designed by IDS for use for IDS hardware products are warranted not to fail to execute their programming instructions due to defects during the warranty period, provided they are properly installed on IDS hardware products. IDS does not warrant if the IDS software will be used and operated in hardware and software combinations not selected by IDS;
- 7) IDS does not assume any liability for any direct, indirect, special, incidental or consequential damages or injuries caused by proper or improper operation of its equipment whether defective or not defective;
- 8) This software may include automated data processing and analysis tools. While every effort is made to ensure the accuracy of the information provided by those tools, they must not be intended as a substitute for intelligent analysis; rather, they have to be intended as an advisor and the user must not completely rely on the results provided by them to give the complete answer. IDS assumes no liability for any direct, indirect special, incidental or consequential damages or injuries caused by such reliance on the accuracy, reliability, or timeliness of the information provided by those tools. Any person or entity who relies on information obtained from the automated data processing/analysis tools only, does so at his or her own risk;
- 9) IDS's warranty does not extend and shall not apply to:
 - a) Products which have been repaired or altered by other than IDS personnel;
 - b) Products which have been subjected to misuse, neglect, accident or improper installation;
 - c) Products in which have been installed Hardware/Software accessories not supplied by IDS and/or without any approval by IDS;
 - d) Products which have been connected to equipment different from the ones supplied by IDS (except the PC data Logger which must conform to IDS specifications);
 - e) Products which have been damaged by natural disaster or calamities.
- 10) Before returning any equipment to IDS, you have to contact the IDS Customer Care Office that will authorize you to return the material to be repaired;
- 11) Once the parts/equipment to be repaired arrive to IDS, IDS may inspect the defective products to verify they are eligible for repair or replacement. All packing must be saved for inspection purpose in order to assist IDS to understand the cause of the defects. IDS, will not be obliged to repair, or replace for products returned as defective but damaged from abuse, misuse, negligence, accident loss or damage in transit;
- 12) The final clients, is responsible for ensuring the defective products returned to be properly packaged;
- 13) The above warranty are sole and exclusive, and no other warranty, whether written or oral, is expressed or implied.

IMPORTANT NOTE FOR THE US CUSTOMERS

FCC ID: UFW-ALADDIN-NA

This device complies with part 15 of the FCC Rules:

Operation is subject to the following conditions:

1. This device may not cause harmful interference, and
2. This device must 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.

Operation of this device is restricted to law enforcement, fire and rescue officials, scientific research institutes, commercial mining companies, and construction companies. Operation by any other party is a violation of 47 U.S.C. § 301 and could subject the operator to serious legal penalties.

Coordination Requirements.

(a) UWB imaging systems require coordination through the FCC before the equipment may be used. The operator shall comply with any constraints on equipment usage resulting from this coordination.

(b) The users of UWB imaging devices shall supply detailed operational areas to the FCC Office of Engineering and Technology who shall coordinate this information with the Federal Government through the National Telecommunications and Information Administration. The information provided by the UWB operator shall include the name, address and other pertinent contact information of the user, the desired geographical area of operation, and the FCC ID number and other nomenclature of the UWB device. This material shall be submitted to the following address:

Frequency Coordination Branch., OET

Federal Communications Commission

445 12th Street, SW

Washington, D.C. 20554

ATTN: UWB Coordination

(d) Users of authorized, coordinated UWB systems may transfer them to other qualified users and to different locations upon coordination of change of ownership or location to the FCC and coordination with existing authorized operations.

(e) The NTIA/FCC coordination report shall include any needed constraints that apply to day-to-day operations. Such constraints could specify prohibited areas of operations or areas located near authorized radio stations for which additional coordination is required before operation of the UWB equipment. If additional local coordination is required, a local coordination contact will be provided.

(f) The coordination of routine UWB operations shall not take longer than 15 business days from the receipt of the coordination request by NTIA. Special temporary operations may be handled with an expedited turn-around time when circumstances warrant. The operation of UWB systems in emergency situations involving the safety of life or property may occur without coordination provided a notification procedure, similar to that contained in CFR 47 Section 2.405(a)-(e), is followed by the UWB equipment user.

Notice: Use of this device as a wall imaging system is prohibited by FCC regulations.

According to the FCC Part 15 rules, the system includes a manually operated switch ("dead-man switch") that causes the transmitter to cease operation within 10 seconds of being released by the operator.

The use of this switch is further explained in this manual; specific instructions for operating a system sold in the US are identified by the following label



INDEX

1. INTRODUCTION	13
1.1 Purpose.....	13
1.2 Field of application.....	13
1.3 Reference	13
1.3.1 Referenced Documents	13
1.4 Acronyms and Definitions.....	13
1.4.1 Acronyms.....	13
1.4.2 Definitions.....	13
1.5 How to use this manual.....	14
2. SYSTEM COMPONENTS	15
3. HOW TO SET UP THE SYSTEM.....	16
3.1 Opening the case.....	16
3.2 Connecting up the system	20
3.2.1 How to assemble the frame to the antenna	20
3.2.2 How to assemble the metric wheel to the frame	21
3.2.3 Assembly of the slide on the frame.....	21
3.2.4 How to assemble the fork and the handle on the frame	22
3.3 Cable connection of the system.....	22
3.3.1 Complete list of cables	22
3.4 Technical advice	25
4. HOW TO USE THE SYSTEM.....	26
4.1 Main functions	26
4.2 Functioning principles using the PSG carpet.....	27
4.3 Work procedure using the Aladdin system	28
4.3.1 "Automatic" mode.....	28
4.3.2 "Manual" Mode.....	30
4.3.3 "Manual (no check)" Mode.....	30

PICTURES INDEX

FIG. 2-1 – FINAL CONFIGURATION.....	15
FIG. 3-1 – OPENING THE CASE.....	16
FIG. 3-2 – REMOVING THE BATTERY	16
FIG. 3-3 – REMOVING THE DAD AND THE ANTENNA TROLLEY	17
FIG. 3-4 – REMOVING THE BIPOLAR ANTENNA.....	17
FIG. 3-5 – BOTTOM SECTION.....	18
FIG. 3-6 – UPPER SECTION	18
FIG. 3-7 – INSERTING THE SUPPORT LEGS.....	19
FIG. 3-8 – FIXING THE WORKTABLE.....	19
FIG. 3-9 – FINAL SET-UP OF THE WORKTABLE	20
FIG. 3-10 – ASSEMBLY OF THE FRAME ON THE ANTENNA.....	20
FIG. 3-11 – ASSEMBLY OF THE METRIC WHEEL ON THE FRAME.....	21
FIG. 3-12 – ASSEMBLY OF THE SLIDE ON THE FRAME.....	21
FIG. 3-13 – ASSEMBLY OF THE HANDLE TO THE FRAME.....	22
FIG. 3-14 – FIXED CONNECTION CABLE BETWEEN THE BIPOLAR ANTENNA AND DAD	23
FIG. 3-15 – CONNECTING THE REMOTE CONTROL CABLE	23
FIG. 3-16 – LAN CABLE.....	24
FIG. 3-17 – POWER CABLE	24
FIG. 3-18 – METRIC WHEEL CABLE.....	24
FIG. 4-1 – OPENING WINDOW K2 SW	26
FIG. 4-2 – EXTERNAL DEVICE SETTINGS COMMAND.....	27
FIG. 4-3 – SELECTION WINDOW FOR ALADDIN PSG MODE.....	27
FIG. 4-4 –ALADDIN PSG FIELD	28
FIG. 4-5 – ALADDIN SYSTEM.....	29
FIG. 4-6 – PSG CARPET	31
FIG. 4-7 – FEATURES OF PSG AND SLIDE	32

1. INTRODUCTION

This manual contains a complete description of the "Aladdin" structures kit, including details on how to assemble the kit hardware, use it and operate the software interface

1.1 Purpose

This document is intended to be used as a guide for the installation and use of the "Aladdin" structures kit.

1.2 Field of application

This product must only be used for applications in the civil engineering field.

1.3 Reference

1.3.1 Referenced Documents

- [RD1] MN/2006/052 (K2 Data Acquisition Software User's guide)
- [RD2] MN/2005/002 (GRED 3D Data Elaboration Software).

1.4 Acronyms and Definitions

1.4.1 Acronyms

- K2:** IDS georadar data acquisition software.
- DAD:** radar control unit

1.4.2 Definitions

Field survey: a group of field acquisitions relating to a single survey

Raw data: unprocessed data obtained during a field survey.

Maps: graphics showing the change in received radar signal (signal intensity in gray scale) with respect to the scanning direction. These signals must be processed to be comprehensible

Survey: the name given to a collection of acquisitions, which together cover all the areas of a large investigation: typically an entire town or a large urban area.

Scan: a single movement of the antenna trolley from the beginning to the end of a pre-established path.

Data processing: this is applied to the raw data to permit the acquired sections to be viewed in a comprehensible way.

Setup: initialisation of a piece of equipment or a software process

1.5 How to use this manual

This manual is divided into the following sections:

Chap. 1: Introduction.

Chap. 2: System composition.

Chap. 3: How to set up the system.

Chap. 4: How to use the system.

2. SYSTEM COMPONENTS

The "Aladdin" structures kit consists of the following parts:

1. Bipolar antenna
2. Connection box
3. Trolley handle.
4. Antenna survey kit
5. Notebook PC.
6. DAD box.
7. 1 cable to connect the antenna to the DAD.
8. 1 battery.
9. 1 battery charger.
10. USB stick + acquisition software.
11. CD-ROM + GRED 3D processing software.
12. Transportation case.
13. PSG (Pad Survey Guide) carpet.

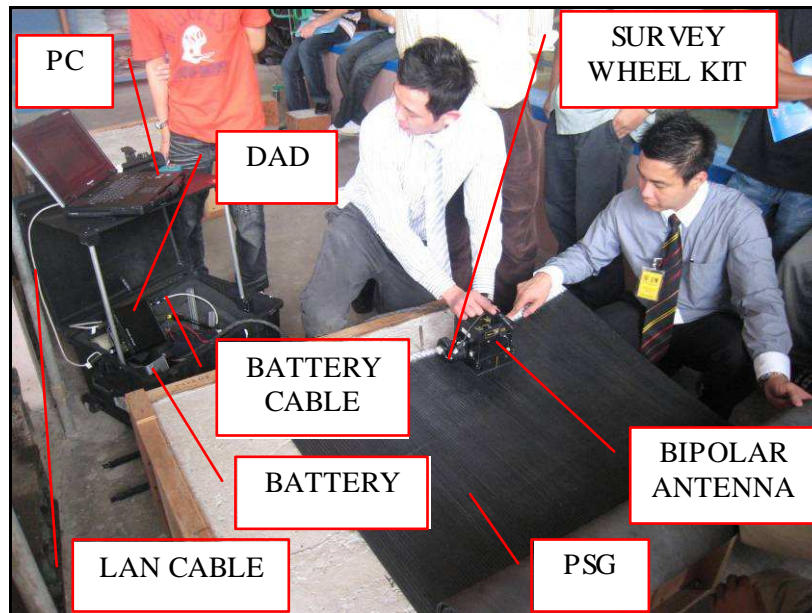


Fig. 2-1 – Final configuration

3. HOW TO SET UP THE SYSTEM

3.1 Opening the case

When you receive the case containing the "Aladdin" structures kit, follow the procedure below:

- Open the protective case, remove the bottom divider and take out the antenna trolley steering handle (see Fig. 3-1).



Fig. 3-1 – Opening the case

- If you want to remove the battery, unscrew the black screw shown in the picture (Fig. 3-2).

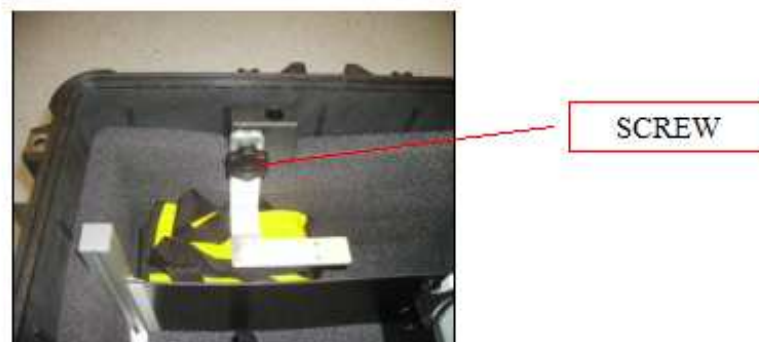


Fig. 3-2 – Removing the battery

- Undo the Velcro that keeps the DAD unit blocked, now remove the DAD and the trolley (Fig. 3-3).

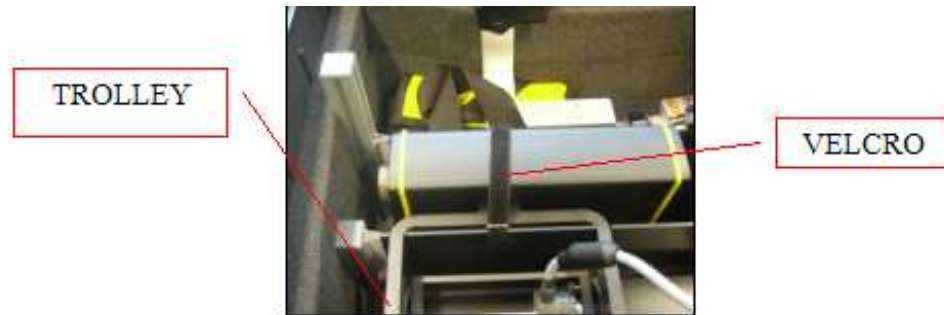


Fig. 3-3 – Removing the DAD and the antenna trolley

- Remove the bipolar antenna, pushing the lever towards the foam support then lift the antenna out rotating it slightly (see the direction of the red arrow in Fig. 3-4); when you have to replace the antenna in the case, be careful that the white pegs on the side of the antenna are blocked into the two holes inside the case (indicated with the red circle).

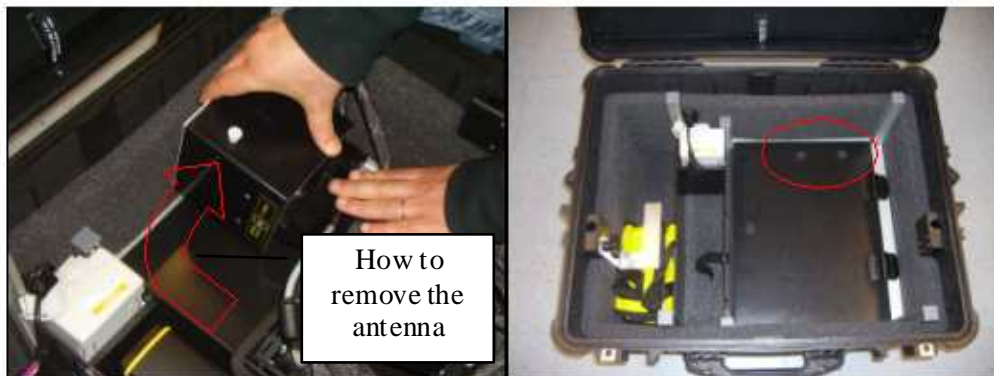


Fig. 3-4 – Removing the bipolar antenna

- Open the bottom section (Fig. 3-4 and Fig. 3-5); this is the PC storage area; if a PC has not been supplied with your order, you can store your own PC here using the pre-cut foam to model a suitably shaped space (Fig. 3-5). The maximum space available for storing a PC is 34cm x 27cm x 5cm.



Fig. 3-5 – Bottom section

- Undo the Velcro on separator of the top part of the case and lift up the top section (Fig. 3-6).



Fig. 3-6 – Upper section

- Remove the two support legs and insert them in the holes in the bottom of the case (Fig. 3-7).



Fig. 3-7 – Inserting the support legs

- Close the lid of the case, inserting the legs into the upper supports (Fig. 3-8).



Fig. 3-8 – Fixing the worktable

- Connect the power cable to the battery then replace the lower cover onto the case to provide a second surface for sitting the material from the kit (Fig. 3-9).



Fig. 3-9 – Final set-up of the worktable

3.2 Connecting up the system

3.2.1 How to assemble the frame to the antenna

As we can notice from the Fig. 3-10 the procedure of assembly of the frame on the antenna is the following:

- Link the frame as indicated in the pictures below and then push it up in order to connect it in the lateral white nuts.



Fig. 3-10 – Assembly of the frame on the antenna

3.2.2 How to assemble the metric wheel to the frame

- Screw the central nut of the metric wheel in the lateral hole located on the frame, keeping the wheel in vertical position (see Fig. 3-11).

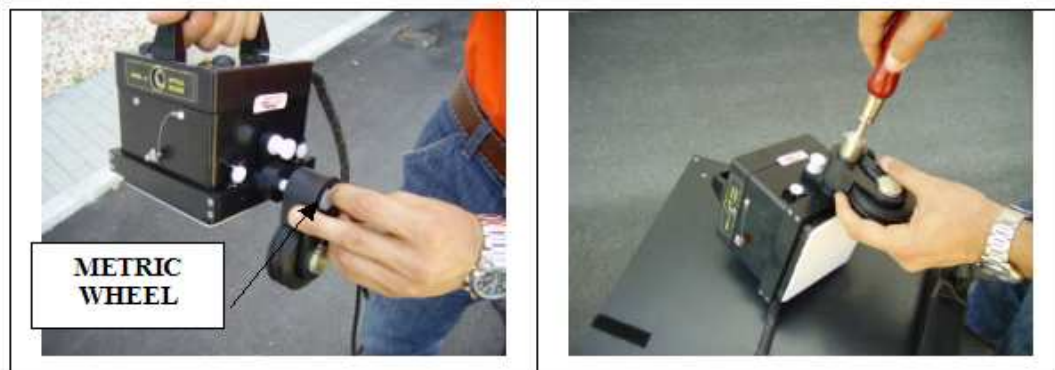


Fig. 3-11 – Assembly of the metric wheel on the frame

3.2.3 Assembly of the slide on the frame

- Put the slide under the antenna fitting the two lateral holes located on the front and back side of the antenna as indicated in Fig. 3-12. The slide holds a special film PSG type (Pad Survey Guide) in order to use it only in combination with the PSG carpet (see Par 4.3.3).
- Screw the four nuts to the relative holes.

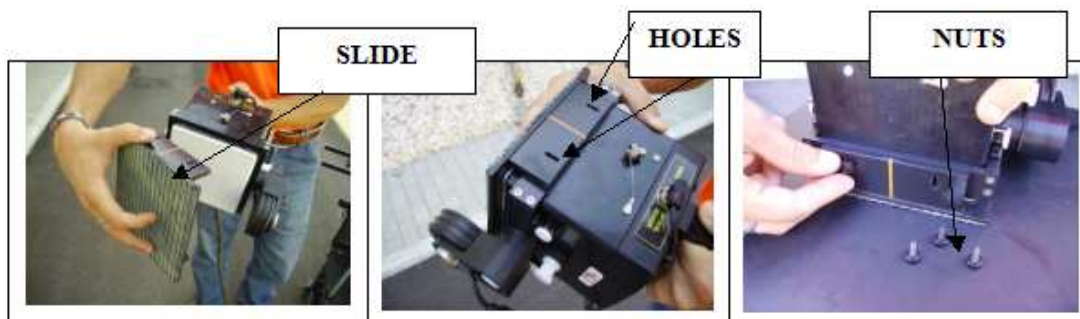


Fig. 3-12 – Assembly of the slide on the frame

3.2.4 How to assemble the fork and the handle on the frame

- In order to assemble the handle it's necessary to insert the fork at the end of the handle in the point indicated in Fig. 3-13 and then screw the nut.
- Then connect the fork of the handle to the frame making pressure on the two white lateral nuts up to link them.

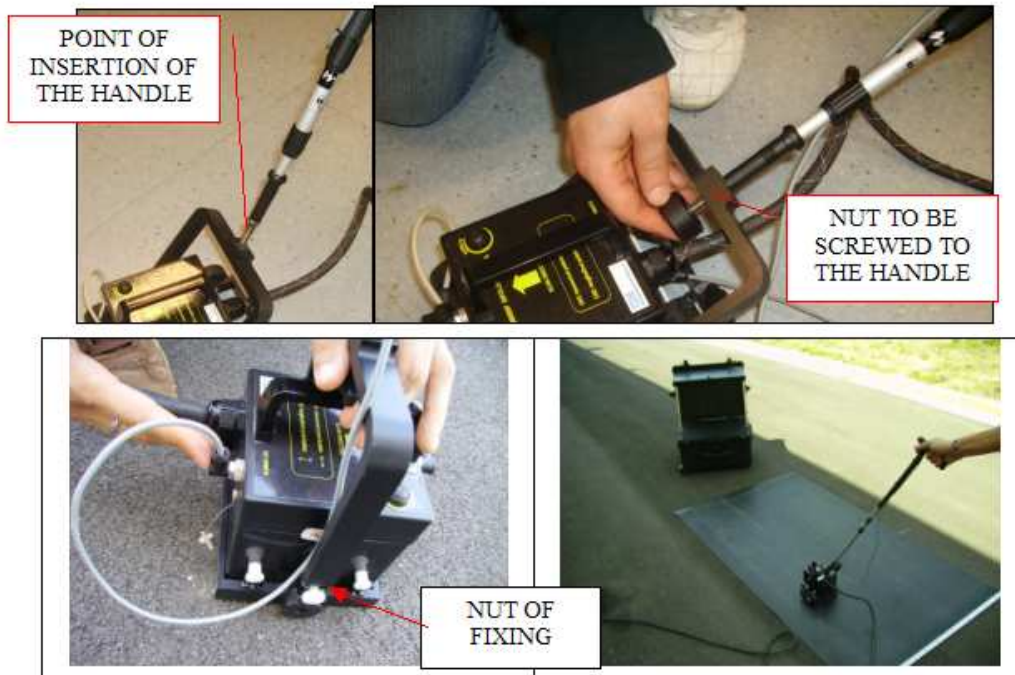


Fig. 3-13 – Assembly of the handle to the frame

3.3 Cable connection of the system

3.3.1 Complete list of cables

The following list contains all the structures kit cables and how they are connected:

- Fixed connection between the bipolar antenna and DAD (Fig. 3-14);



Fig. 3-14 – Fixed connection cable between the bipolar antenna and DAD

- Remote control cable connecting the antenna to the handle (Fig. 3-15); after inserting and tightening the handle screw to the fork connected to the antenna, connect the handle cable to the port situated on the back of antenna labelled "REMOTE" (Fig. 3-15).



Fig. 3-15 – Connecting the remote control cable

- LAN cable connecting the PC to the DAD (Fig. 3-16); connect the large LAN connector to the port on the DAD and the other end to the smaller port on the back of the PC;



Fig. 3-16 – LAN cable

- Cable connecting the battery power supply to the DAD (Fig. 3-17); connect the metallic connector to the DAD and the white plastic connector to the battery.



Fig. 3-17 – Power cable

- Metric wheel cable: connect the cable of the metric wheel to the WHEEL port located on the front side of the antenna (Fig. 3-18).



Fig. 3-18 – Metric wheel cable

3.4 Technical advice

Pay special attention to the following technical advice to avoid operational problems:

- Fix the pad to the surface being investigated with adhesive tape.
- Avoid treading on the paper pad, this may damage it making it unusable.
- Block the antenna cable to the handle with Velcro when using the device so the cable doesn't get in the way

4. HOW TO USE THE SYSTEM

4.1 Main functions

To access the "Aladdin" structures kit from the K2 SW, you have to open a dedicated session.



Fig. 4-1 – Opening window K2 SW

Step 1 Click once with the left mouse button on the "K2" icon contained in the blue bar at the top of the initial K2 SW window (see Fig. 4-1). A series of options appears, from which you have to select *External device settings* (see Fig. 4-2).



Fig. 4-2 – External device settings command

4.2 Functioning principles using the PSG carpet

Step 1 click once with the left mouse button on the “K2” icon on the blue bar of the initial K2 SW window (see Fig. 4-1), the menu that appears contains a series of commands, from which you should select **External device settings** (see Fig. 4-2).

Step 2 this opens the window shown in Fig. 4-3, from where you can select **Aladdin PSG** from the **External device type** field if you are going to use the PSG carpet.

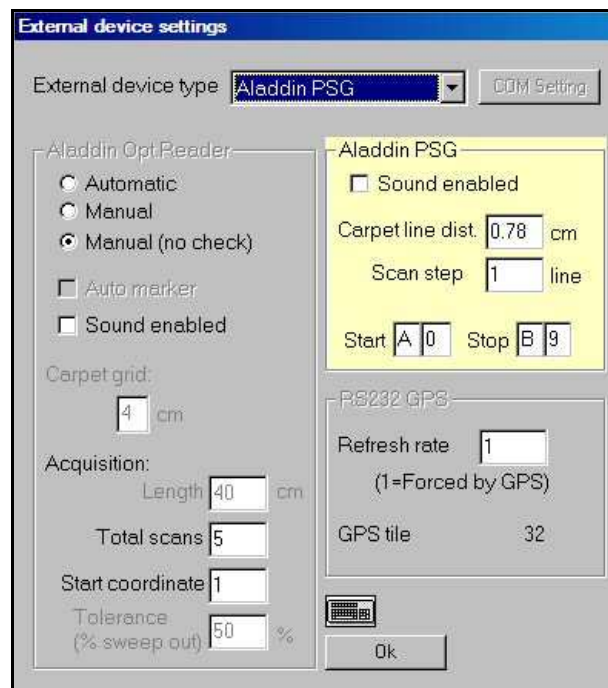


Fig. 4-3 – Selection window for Aladdin PSG mode

Step 3 in Aladdin PSG mode, you can select the acquisition coordinates (see Fig. 4-4).

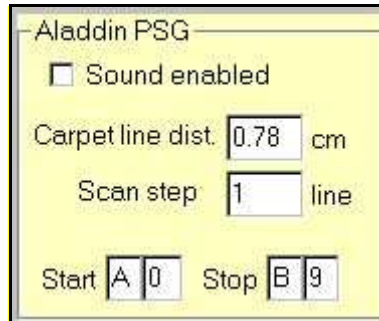


Fig. 4-4 – Aladdin PSG field

- The following parameters can be selected in this field:
 - **Sound enabled:** activates acoustic sound during acquisition;
 - **Carpet line dist.:** distance between two lines on the PSG carpet.
 - **Scan step:** setting the value “n” in this field, you decide to perform 1 scan every “n” lines on the PSG.
 - **Start/Stop:** these are the initial and final scan coordinates to be performed on the PSG carpet.

4.3 Work procedure using the Aladdin system

4.3.1 "Automatic" mode

Step 1: Assemble the system and place the pad on the surface to be investigated (see Fig. 4-5).



Fig. 4-5 – Aladdin system

Step 2: Start the K2 SW, perform the calibration and set the Aladdin structures kit parameters.

NOTE	Using a bipolar antenna, only longitudinal scans must be performed; for a single high frequency antenna, perform both longitudinal and transversal scans
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Step 3: Position the antenna on the initial preset coordinate in the L (or T) direction and carefully position the antenna until the acoustic signal stops.

Step 4A (Standard System): Press one of the START buttons placed on the handle or directly on the antenna ; a special acoustic signal will confirm that the START button has been pressed.

Step 4B (US System): Press one of the START buttons placed on the handle or directly on the antenna **and keep it pressed**; a special acoustic signal will confirm that the START button has been pressed. Releasing the button, will stop the collection after 10 sec.

4.3.2 "Manual" Mode

Steps 1-4: Follow the same procedure described for "Automatic" mode above.

Step 5: Acquisition starts when you press the START button, independently of the position of the first horizontal line encountered.

Step 6A (Standard System): Insertion of *User Markers* during scanning is performed by rapidly pressing the START button.

Step 6B (US System): Insertion of *User Markers* during scanning is performed by **rapidly releasing and pressing again** the START button.

Step 7A (Standard System): The scan is STOPPED by keeping the START button pressed

Step 7B (US System): The scan is STOPPED by releasing the START button



NOTE!	The system keeps control of data quality (<i>Tolerance</i>) in both <i>Automatic</i> and <i>Manual mode</i> . In fact, if this tolerance is respected, a confirmation acoustic signal is activated; if the tolerance exceeds the pre-set percentage during the scan, an error acoustic signal is heard, the scan isn't saved and you have to repeat it.
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4.3.3 "Manual (no check)" Mode

Step 1-7: In this case the user must use the PSG carpet –Pad Survey Guide Guide (Fig. 4-6) with the slide applied under the frame (see Par. 3.2.3).



Fig. 4-6 – PSG Carpet

The PSG carpet holds alternated upper and lower guides in order to make the slide perfectly fit and for the antenna to realize straight scans. Also the slide holds a special film on its external surface removing to the minimum the friction during the drag of the antenna on PSG. Finally the PSG holds on its edge a graduated horizontal pole with the indication of numbers and letters in progressive sequence, in order to give to the user a reference point at the beginning of the scan (Fig. 4-7).

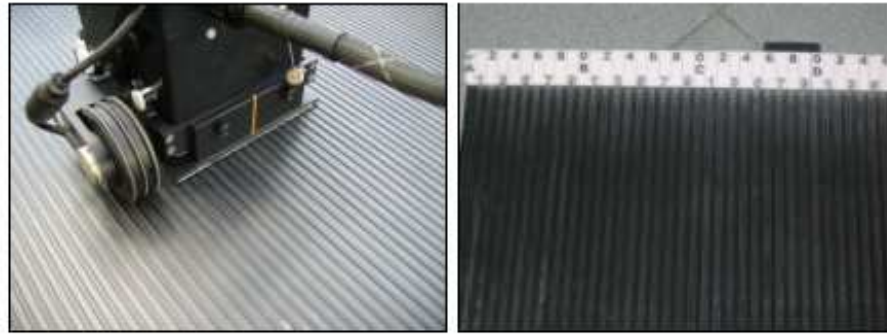


Fig. 4-7 – Features of PSG and slide

Follow the same operative procedure used in the "Manual" procedure described above.

NOTE!	The main difference with respect to the "Manual" mode consists in the absence of the <i>Tolerance</i> control factor, therefore you are free to choose how long the scan should be (<i>Length</i>). This mode is useful when scans of different lengths have to be performed.
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