

PipeHawk plc

e-Spect™
PipeHawk Technology™

Subsurface Inspection System

Operator's Manual



LEGAL COMPLIANCE

COPYRIGHT

PipeHawk™ © Copyright PIPEHAWK PLC 2010. All Rights Reserved

This manual and the Software and Hardware described in it are copyright with all rights reserved. No part of this publication may be reproduced, transmitted, transcribed, stored in a retrieval system or translated into any language in any form without the written permission of **PIPEHAWK PLC**. Brand names, company names and product names which are trademarks or registered trademarks of their respective companies are fully acknowledged.

Whilst every care has been taken in preparing this document to ensure that the information herein is correct as at the time of publication, no warranties or representations are given nor implied hereby and no use is authorised in respect of this document except for the specific purposes for which it is supplied. This document does not form part of or constitute any contract with **PIPEHAWK PLC** unless attached to and expressly stated to be incorporated therein.

PIPEHAWK PLC reserves the right to revise and improve its products as it sees fit.

RADIO LICENSING AND PRODUCT COMPLIANCE NOTICE

The e-Spect is a GPR system and should only be operated in accordance with the relevant radio equipment and licensing requirements applicable to the country in which the system is operated.

PRODUCT COMPLIANCE - EUROPE

In approximately 40 countries of Europe, and all countries in the European Union, the European Telecommunications Standards Institute (ETSI) sets relevant product standards. For the e-Spect the relevant standards against which it has been tested and found to be compliant are for radio emissions:

ETSI EN 302 066-1 Electromagnetic compatibility and Radio spectrum Matters (ERM); Ground- and Wall-Probing Radar applications (GPR/WPR) imaging systems; **Part 1:** Technical characteristics and test methods.

ETSI EN 302 066-2 Electromagnetic compatibility and Radio spectrum Matters (ERM); Ground- and Wall-Probing Radar applications (GPR/WPR) imaging systems; **Part 2:** Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive

and for Electromagnetic Compatibility:

ETSI EN 301 489-32 Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; **Part 32:** specific conditions for Ground- and Wall- probing Radar applications

In addition to the GPR system the e-Spect supports other radio systems, all of which have been purchased on an OEM basis with product compliance certificates from their respective manufacturers and integrated in accordance with:

ETSI TR 102 070-1 Electromagnetic compatibility and Radio spectrum Matters (ERM); Guide to the application of harmonized standards to multi-radio and combined radio and non-radio equipment; **Part 1:** ElectroMagnetic Compatibility

ETSI TR 102 070-2 Electromagnetic compatibility and Radio spectrum Matters (ERM); Guide to the application of harmonized standards to multi-radio and combined radio and non-radio equipment; **Part 2: Effective use of the radio frequency spectrum**

In addition the following guidelines have been observed:

Guidelines on the application of **Directive 2006/95/EC** (Electrical Equipment designed for use within Certain Voltage Limits) August 2007.

COMPLIANCE WITH MANUFACTURER'S DESIGN-MODIFICATION WARNING

Changes or modifications not expressly approved by the party for compliance **could void the user's authority to operate the equipment.**

RADIO LICENSING - EUROPE

In European countries it may be necessary to obtain a radio licence from the relevant National Radio Licensing Authority before operating the e-Spect. This provision is seen by some National Radio Licensing Authorities as a consequence of allowing higher power levels than in for example the USA and restricting use to trained **competent** professionals. The requirements of radio licensing regimes for GPR are defined in CEPT **ECC Decision ECC/DEC/ (06)08** and require the user to keep a Log of GPR Use.

At present the only country to have implemented the regime is the UK, via the Office of Communications (**Ofcom**). Licences are issued for three years, conditional upon the user keeping the required log, observing co-ordination conditions within 7km of any of the UK's 6 radio astronomy sites and operating in accordance with the ETSI Code of Practice for Use.

CODE OF PRACTICE FOR USERS

The radio regulatory regime is based upon the users observing appropriate operating procedures as defined in:

ETSI EG 202 730 Electromagnetic compatibility and radio spectrum Matters (ERM); Code of Practice in respect of the control, use and application of Ground probing radar (GPR) and Wall probing radar (WPR) systems and equipment. This supercedes the earlier guidance given in **ETSI Technical Report, TR 102 554**.

Failure to operate in accordance with these requirements may void the entitlement of the user to operate the equipment. An important element of the radio licensing regime and Code of Practice is that use is restricted to trained competent professionals.

PLEASE NOTE

This product has been designed to comply with the relevant standards and regulations that apply within Europe.

If you intend to use this product outside of Europe: You MUST ensure that it also complies with all relevant local and national standards & regulations PRIOR to use.

RECORD OF REVISIONS

REVISION	DATE	CHANGE	NAME
A		First Release	

PREFACE

PIPEHAWK PLC'S new **e-Spect** system has been developed using 'State of the Art' technology. This technology offers a means of accurately pinpointing underground piping, whether plastic or metal, providing the operator with an immediate display of its location.

The **e-Spect** has been built to very high standards, but requires care and attention to maintain this performance. This manual has been designed with to provide the operator with the information on the Operating and Maintenance procedures necessary for the machine to function reliably and give the designed performance.

Read this manual carefully before operating the machine. It should be kept with or near the machine for easy reference.

WARNING

All Operators of the **e-Spect** system should make themselves fully aware of the information presented in this manual.

Service of this machine is to be carried out only by fully trained and authorised personnel.

SAFETY NOTICE

The e-Spect is designed for deployment in a Live Site Environment. All operators must ensure they take all precautions and observe all safety procedures regarding operation in this or any other operating environment. All road traffic and other regulations must be observed and high visibility and other safety clothing worn. PipeHawk plc takes no responsibility whatsoever for the safety of operators in these environments.

CONTENTS

LEGAL COMPLIANCE	1
COPYRIGHT	1
RADIO LICENSING AND PRODUCT COMPLIANCE NOTICE.....	1
PRODUCT COMPLIANCE - EUROPE	1
COMPLIANCE WITH MANUFACTURER’S DESIGN-MODIFICATION WARNING	2
RADIO LICENSING - EUROPE	2
CODE OF PRACTICE FOR USERS.....	2
RECORD OF REVISIONS	3
PREFACE	4
SAFETY NOTICE	5
CONTENTS	6
1.0 INTRODUCTION	7
2.0 TECHNICAL SPECIFICATION	8
2.1 GPR SYSTEM	8
2.2 TECHNICAL SPECIFICATION	9
2.2.1 <i>Operating and Storage Conditions</i>	9
2.2.2 <i>Mechanical Data</i>	9
2.2.3 <i>Electrical Power Requirement</i>	9
2.2.4 <i>Detection</i>	9
2.2.5 <i>Screen</i>	9
2.2.6 <i>Construction</i>	9
2.2.7 <i>DownLoading Measurement Data</i>	9
3.0 MAINTENANCE AND CARE OF THE E-SPECT	10
3.1 CARE OF THE E-SPECT	10
3.2 THE ANTENNA WEAR MEMBRANE.....	10
3.3 BATTERY AND BATTERY CHARGING.....	11
3.4 DISC MANAGEMENT	11
4.0 THE USER INTERFACE – INTRODUCTION AND INITIAL MENU OPTIONS	12
4.1 INTRODUCTION	12
4.2 POWER DOWN MENU	14
5.0 IMMEDIATE MARK OUT (IMO) OPERATION	15
5.1 THE MAIN IMMEDIATE MARK OUT (IMO) MENU	15
5.2 TOOLS MENU – IMO MODE	16
5.3 DATA COLLECTION MENU.....	19
5.4 DATA REVIEW MENU	20
5.5 DATA DELETE MENU	22
6.0 PIPEHAWK IMO QUICK REFERENCE GUIDE	26

1.0 INTRODUCTION

The **E-Spect** is a GPR (Ground Probing/Penetrating Radar) designed to allow a fully trained & competent operator to locate and map the position of buried anomalies. Additional features are available on some models to distinguish those anomalies displaying linear characteristics normally associated with pipes and cables.

The depth interrogated varies according to the subsurface conditions. The e-Spect captures signals reflected within fixed time intervals, but the speed of the signal varies with soil conditions and as a consequence the depth searched alters. The average penetration will be greater in sandy or dry conditions than in clay or wet conditions. The typical depth searched is 0.6m to 1.5m. In exceptionally good or bad conditions the depth may exceed 2m, or be restricted to less than 0.5m.

It should be noted that detection success can normally be improved by deploying the GPR at right angles to the perceived path of any linear target. It is recognised that at the outset the path may be unknown however, in a street environment; pipes, cables or other linear features are most likely to run in line with, or directly across the street.

The GPR signals captured by the e-Spect contain information concerning a large number of underground features that act as GPR targets. In order to distinguish between them they must be coded in some way, the coding arises through moving the GPR past the targets. If a pipe is crossed orthogonally, it is seen as a point like object and generates a characteristic hyperbolic response, which may be recognised by the operator. It is the regular appearance of such point like targets in a sequence of parallel scans that allows a pipe or a cable to be distinguished as a linear feature throughout the volume of interest.

The **e-Spect** is designed for operation using PipeHawk's classic IMO software. Processing of collected data may however be achieved using either IMO software or other suitable 3rd party GPR software packages.

Immediate Mark Out (IMO) This mode allows the operator to complete long linear searches or scans for buried targets. The operator slowly pushes the system forward and a display appears on the screen showing the underground data after processing to reveal the presence of underground anomalies. Typically a point like target such as a pipe or cable, when crossed orthogonally, generates a characteristic hyperbolic response, which with training and a little experience is readily recognisable by the operator. The e-Spect must pass over the target to generate the full hyperbola, but the pull back facility provided allows the operator, while looking at the screen, to re-position the e-Spect directly over the targets, using the Arrows marked on the case as a guide.

In this mode the target is identified as a point like object, which does not positively identify a particular pipe or cable as other targets such as large stones may produce similar responses. In many situations particularly in areas with few utilities away from city centres and in ground that is highly suitable for GPR use, the IMO mode readily distinguishes the path of pipes and cables as the strongest, most consistent signals seen.

2.0 TECHNICAL SPECIFICATION

2.1 GPR System

The **e-Spect** operates by introducing a fast rise-time electromagnetic pulse into the ground. The pulse is scattered by changes in the electrical properties of the ground. The presence of metal generates a major change in electrical properties but the system is sensitive to other changes such as the presence of plastic, water, or air. The scattering produced by changes in ground conditions returns a small fraction of the energy back to the system.

Figure 2.1 shows a general schematic of the radar part of the system, with a pulse generator acting as a transmitter, feeding a signal to the antenna to be introduced into the ground. The signal returned is then received by the antenna, where it is passed to the digital signal processing hardware for manipulation into a suitable format for display.

The e-Spect system is a two piece device. The Yellow case houses the main, transmitter electronics, antenna elements, sampling receiver, battery, and wheel sensor. The Tablet PC style device provides Display, Data storage and processing; along with the touch screen operational Interface. The supplied battery may also be used externally, helping to reduce operator fatigue when scanning vertical or inverted surfaces such as wall & ceilings.

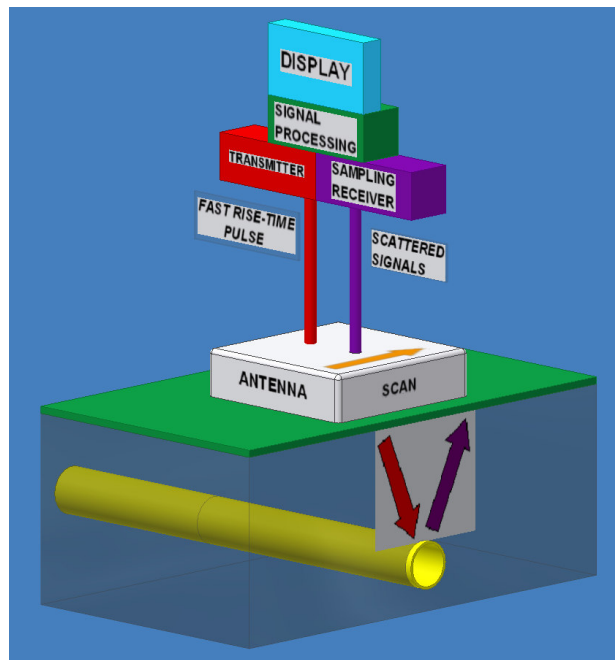


Figure 2.1 Simplified Radar System

2.2 Technical Specification

2.2.1 *Operating and Storage Conditions*

Ambient temperature range (operation) -10 °C to 50 °C

2.2.2 *Mechanical Data*

Mass (approximate)	3kg
Dimensions	(excluding extension handle)
Height	270 mm
Length	340 mm
Overall width	180 mm

2.2.3 *Electrical Power Requirement*

Electrical requirement Internal or External 12V battery

2.2.4 *Detection*

Detection range	5cm to 1.5m (dependent upon soil conditions)
Materials	Any material including Plastics, Earthenware & Fibre Optics
Minimum target diameter	18 mm
Information provided	Horizontal position and depth of detected targets.

2.2.5 *Screen*

Liquid crystal display 18cm TFT colour Touch screen.

2.2.6 *Construction*

Impact resistant plastic.

2.2.7 *DownLoading Measurement Data*

Measurement data can be down loaded to a USB2 memory stick for further investigation, or archiving.

3.0 MAINTENANCE AND CARE OF THE E-SPECT

3.1 Care of the e-Spect

The main requirements for the care of **e-Spect** are that: -

- i. The system should be kept clean.
- ii. The antenna should be fitted with a wear membrane that is complete and free from holes or other excess wear.
- iii. A suitably charged battery should be employed.
- iv. There is adequate space on the storage device to store data from the intended site investigation.

All other work should be referred to **PIPEHAWK PLC** or an authorised dealer. The system must be serviced periodically, dependent upon use, with the mechanical parts such as bearings checked for wear and the electronics calibrated. This shall be carried out every twelve months of normal use or six months of heavy use.

CAUTION

Caution shall be exercised when cleaning the system. The minimum amount of water shall be used and pressure must be avoided. It shall be noted that although the main electronics are sealed, the main case contains some sponge like black anechoic material. If this is wet, the performance of the system will be degraded.

Household detergents and water shall be used for cleaning the system. Other cleaning agents may damage the powder or plastic finishes and should not be used.

3.2 The Antenna Wear Membrane

The **e-Spect** is a ground contact device. To prevent damage from use on abrasive surfaces, the antenna is fitted with a non static inducing sacrificial wear membrane.

Under **NO** circumstances should the machine be operated without a wear membrane in place. **Check membrane daily for wear.** If any part of the membrane is worn through it must be replaced immediately.

3.3 Battery and Battery Charging

The **e-Spect** system uses a single 12V 6.3Ah lithium ion battery, which may be housed either in the top of the Main case and accessed through raising the top cover or, in an external body pouch worn by the operator. When fully charged, the battery voltage exceeds the nominal 12V specified. As the charge is used the voltage drops, and the battery must be re-charged when the battery voltage drops below 10V. In the main measurement mode, a low battery warning light will appear when the voltage drops below this critical voltage. **If ignored; the e-Spect will eventually shut down automatically.** The software structure is such that in other menus this facility is disabled to allow functions such as uninterrupted file transfer to be carried out. When removed from the system the status of the battery may be checked by pressing a small button on the top. These light a series of LED's built into the battery case, which indicates the level of charge present.

The Tablet PC like device has a built in battery, or may be powered from the external battery pouch, as required.

A battery charger is provided with each part of the system which corresponds to the battery technology specified. It is essential that only the charger supplied for that technology should be employed. These are the only chargers that should be used to re-charge the **E-Spect** batteries. **PipeHawk plc** takes no responsibility for any damage or loss caused by the use of incorrect batteries or chargers with the e-Spect system. Such an action will invalidate any guarantees or warranty given.

Care is required in connecting the battery charger to the battery. The connectors are shaped so that they can only be connected one way.

The cover of the battery charger must not be removed. The charger must be connected to the mains network in accordance with wiring regulations, only after checking that the voltage rating of the charger is compatible with the local electricity supply.

It should be noted that battery performance degrades with time, with excessive temperatures and with the number of battery charging/discharging cycles. As a guide, the battery manufacturers indicate that if the battery is used regularly and not subjected to any extreme conditions its life should approach 500 cycles. This can not be guaranteed by **PIPEHAWK PLC**.

3.4 Disc Management

A solid state disc is provided on the Tablet PC like device. Prior to operation each day, the availability of space for data storage should be checked. This is done using normal PC tools and does not require the e-Spect system to be connected or turned on.

4.0 THE USER INTERFACE – INTRODUCTION AND INITIAL MENU OPTIONS

4.1 Introduction

The **e-Spect**'s user interface is designed for simplicity, and is based around a backlit liquid crystal display (LCD) and seven touch screen user keys. Icons on the display show the present function of the keys. The icons, where possible, do not include text and therefore may be considered to be international.

The display is divided into three main areas (see below), with the largest area available for data. Below this is an area for operator information. At the right of this area is a battery monitoring area indicating the present state of charge of the battery(s). To the left of the information area is shown an icon often indicating the last key accessed by the operator. To the right of the icon, closer to the middle of the information area relevant text may be present.

The Immediate Mark Out and Mapping Modes are extensive and are covered in subsequent chapters but the other menus will now be presented.

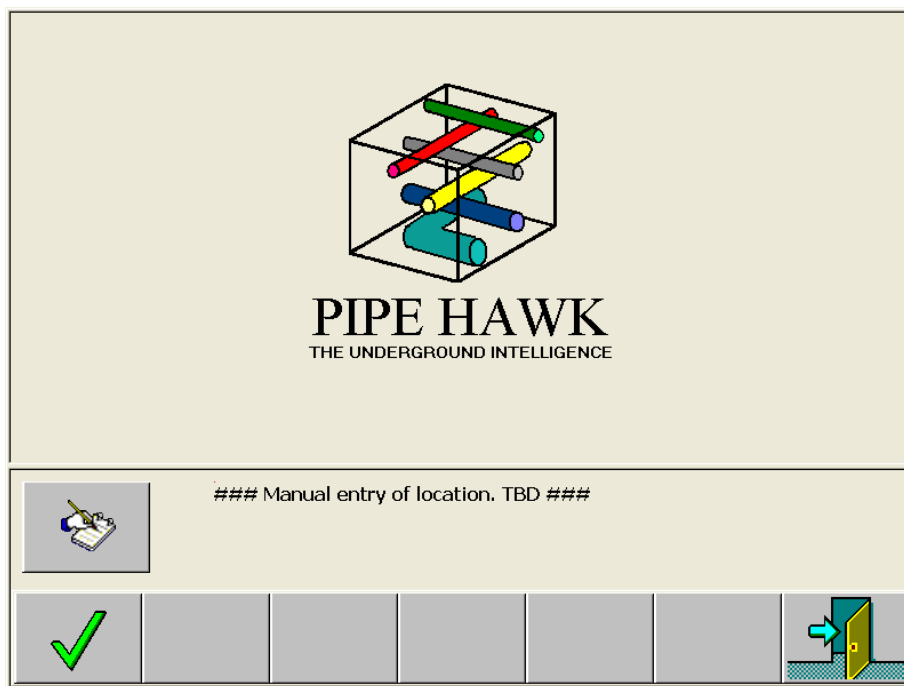


Figure 4.1.1 The Enter Site Location Menu displayed at Switch On

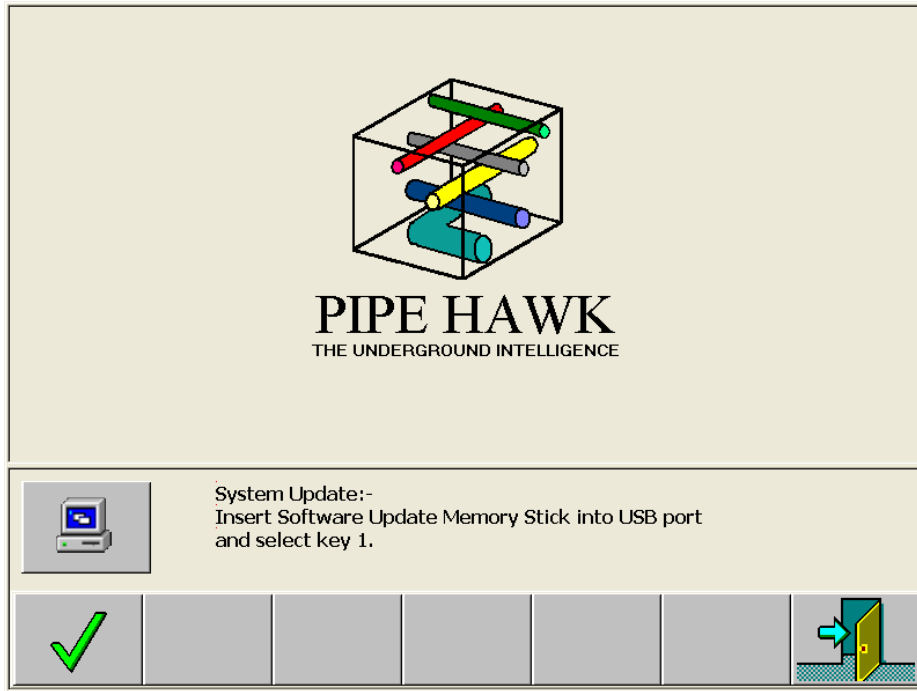


Figure 4.1.2 System Update Menu

4.2 Power Down Menu

Pressing the key corresponding to the power plug icon activates the Confirm Power Down Menu shown in Figure 4.2.1.

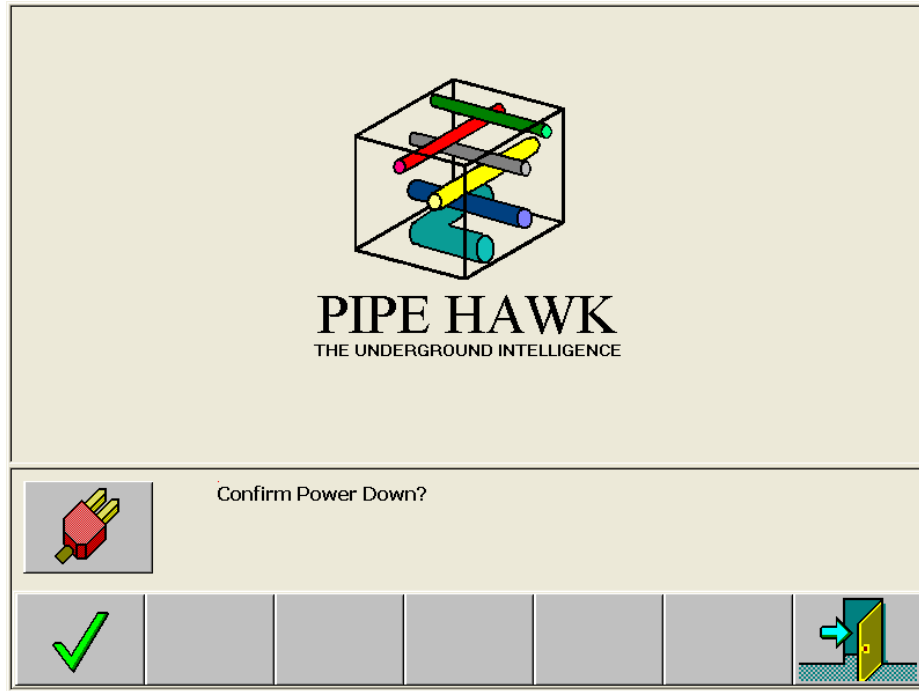


Figure 4.2.1 Confirm Power Down Menu

Pressing the key corresponding to the tick icon then causes the system to power down in a controlled manner with all the captured data being correctly stored including the power down information associated with the Log of GPR Use.

It should be noted that there are similar Power Down Menus in both the IMO and Mapping software options; the only difference is that the large icon corresponding to that function is shown in the large data area.

5.0 IMMEDIATE MARK OUT (IMO) OPERATION

5.1 The Main Immediate Mark Out (IMO) Menu

The Immediate Mark Out software allows the operator to perform GPR scans up to 50m long to search for pipes, cables and other anomalies. This mode is typically employed to gain an initial understanding of the underground environment at a site, to more fully mark out the location of utilities in areas of low to medium density, or to mark out with bio-degradable paint the location of utilities to guide those commencing excavation.

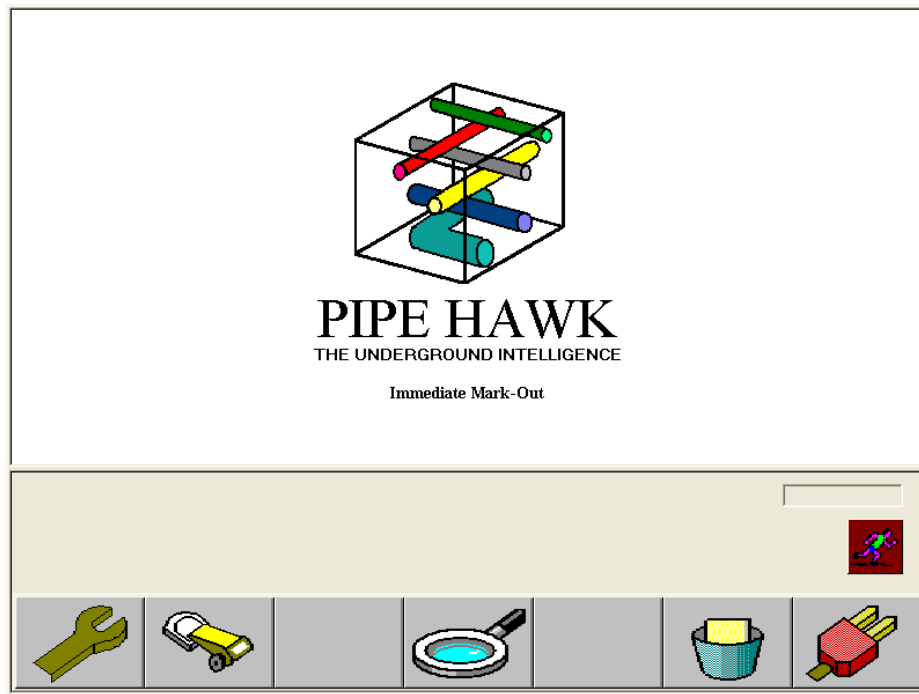




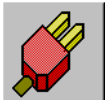


Figure 5.1.1 Main IMO Menu

The five keys shown in the Main IMO Menu activate the following sub menus:

 Tools Menu	 Data Collection Menu
 Data Review Menu	 Delete Data Menu
 Power Down Menu	

5.2 Tools Menu – IMO Mode

Pressing the key corresponding to the spanner icon accesses the Tools Menu

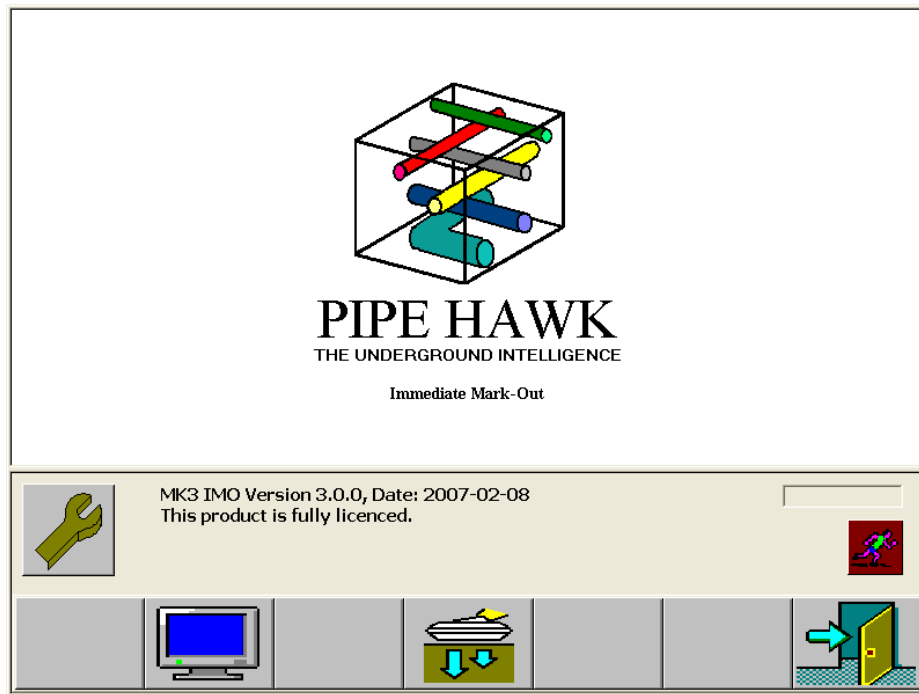

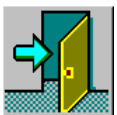



Figure 5.2.1 Tools Menu - IMO Mode

The function of the icons on the Tools Menu – IMO Mode is as shown below:

	<p>The key takes the user to the Change Display Mode and Scan Length Displayed Menu – IMO mode where the mode of the display may be changed between colour and greyscale and the scan length changed. (see below)</p>
	<p>The Depth of Penetration key sets the length of the GPR's timebase aiding the search for shallow or deeper targets, as required.</p> <p>When pressed this icon is displayed to the left of the message area.</p> <p>The message displayed is:</p> <p>Shallow/Deep Antenna selected - Set for shallow/deep penetration</p>
	<p>The Exit Icon appears above the 7th key on many menus and in all cases takes the user back through the menu structure towards the Main Menu.</p>

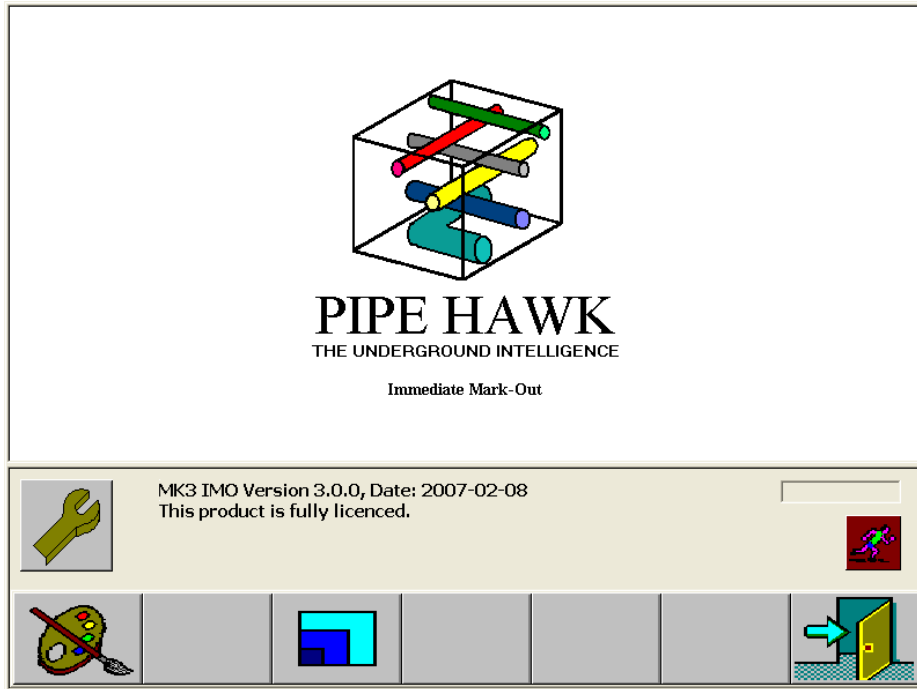




Figure 5.2.2 Change Display Mode and Displayed Scan Length Menu

The function of the keys on the Change Display Mode and Displayed Scan Length Menu is

	<p>This key sets the mode of the display to either colour or greyscale.</p> <p>When pressed this icon is displayed to the left of the message area.</p> <p>The message displayed is: Colour/Greyscale scan display selected</p>
	<p>This key sets the scan length display to 3m, 6m, 9m, 12m or 15m</p> <p>When pressed this icon is displayed to the left of the message area.</p> <p>The message displayed is: Display scale set to 3/6/9/12/15m</p>

When the key corresponding to the palette icon is pressed the icon also appears in the information area with the message: Colour/Greyscale scan selected, and the format of the GPR data in the upper area of the display is changed.

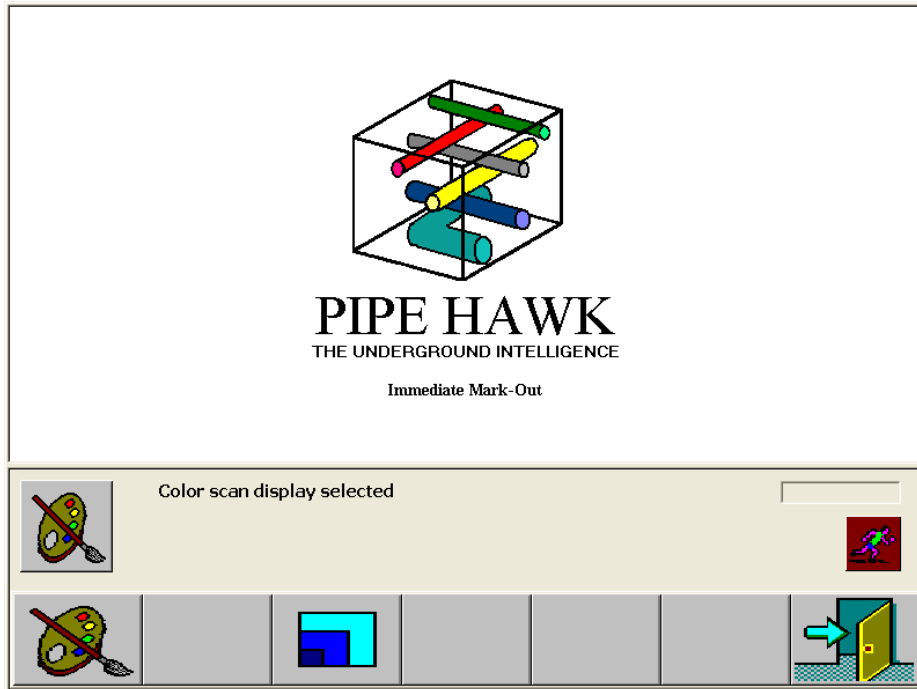


Figure 5.2.3 Colour Mode is activated.

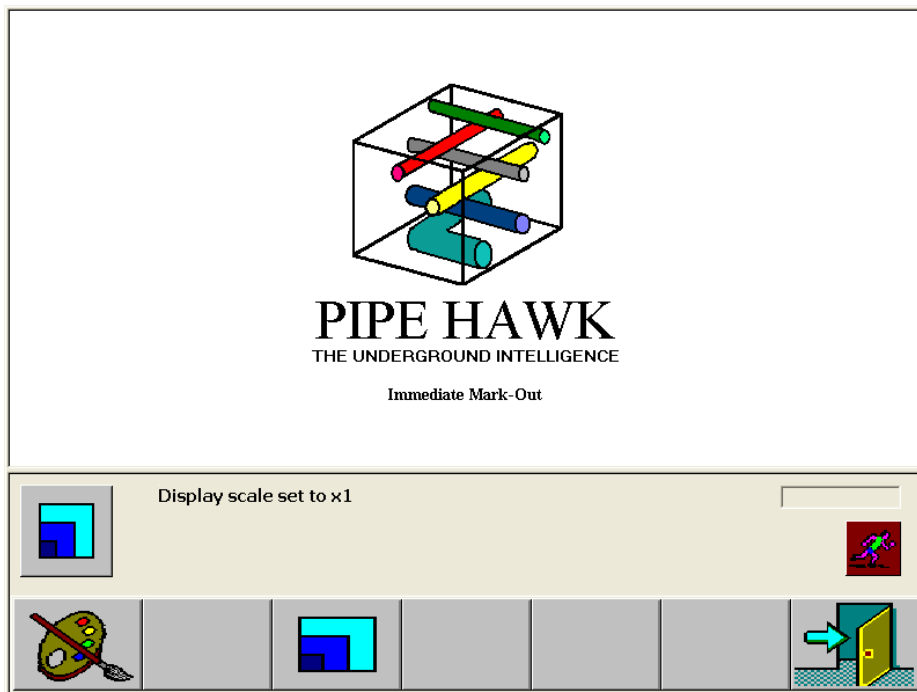


Figure 5.2.4 Display Length set to 1(5m).

When the depth of penetration key is pressed on the Tools Menu, the icon appears in the information area with the message, Shallow/Deep Depth of Penetration selected.

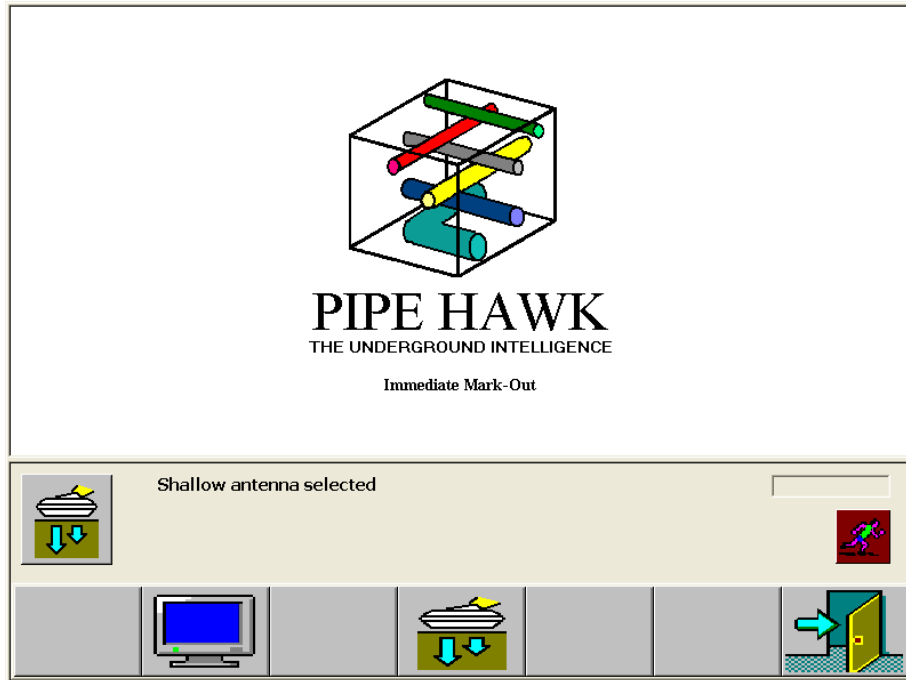


Figure 5.2.5 Tools Menu when the Depth of penetration key is accessed

5.3 Data Collection Menu

The Data Collection Menu accesses the main GPR functions. Apart from the normal exit icon the menu has only two active keys, both with arrow icons. When either of these are pressed the GPR is armed to collect data. Before either of these keys are activated it is necessary that the operator has positioned the E-Spect at the required start position for the scan. For scanning in the forwards direction the right pointing arrow is employed and similarly for backwards scanning the left pointing arrow is employed.

Once either of these is pressed; the Collecting Data Display Menu is accessed and the GPR is set to collect data.

To accurately determine the position of features detected the e-Spect calculates distance travelled by means of a rotary sensor fitted to one of the wheels. Data is only collected when the system is moved in the chosen direction. The e-Spect will display data as it is collected, with a short delay.

Should the e-Spect be moved too quickly; the running man symbol will flash, warning the operator to slow down or start the scan again.



5.3.1..... Over-speed ICON

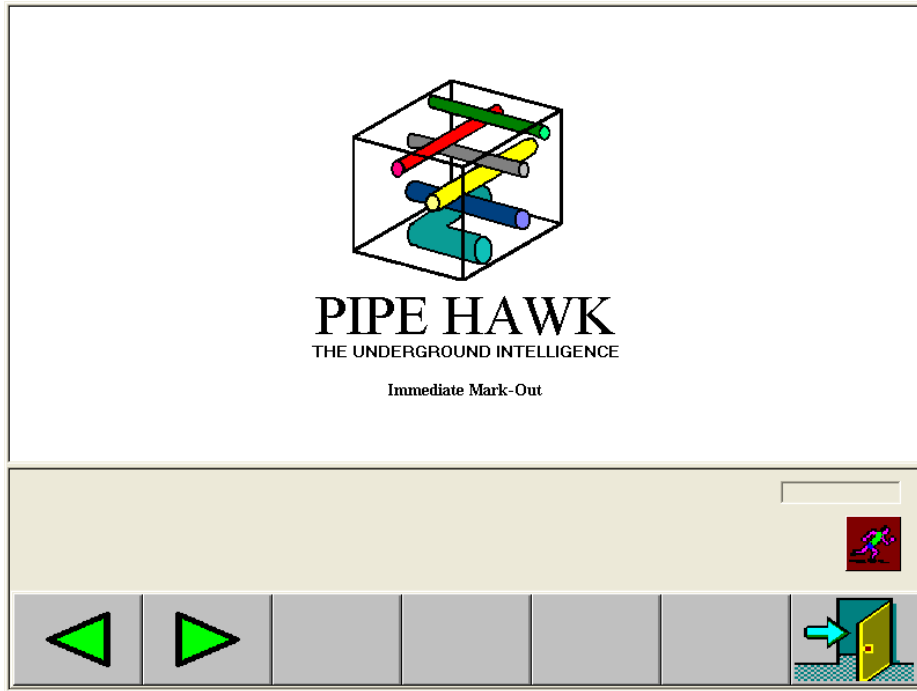


Figure 5.3.2.....Initiate GPR Measurements Menu

5.4 Data Review Menu

The Data Review Menu is selected from the magnifying glass icon key on the Main Menu and is shown in Figure 6.4.1. The menu shows the list of files collected.

On collection, all data is automatically given a unique file name and also date and time stamped, as shown. Employing the keys at the left of the menu the user may scroll up and down the list of available files and select one for review by with it highlighted pressing the key associated with the folder icon. This action accesses the Review Data Menu as shown in Figure 5.4.1.

Title	Created
10120001.PHK	26/02/2008 15:04:42
25010001.PHK	26/02/2008 15:04:42
25010002.PHK	26/02/2008 15:04:42
25020001.PHK	26/02/2008 15:04:42
25020002.PHK	26/02/2008 15:04:42
26020001.PHK	26/02/2008 15:04:42
26020002.PHK	26/02/2008 15:04:42
27010001.PHK	26/02/2008 15:04:42
27010002.PHK	26/02/2008 15:04:42
27010003.PHK	26/02/2008 15:04:42
27010004.PHK	26/02/2008 15:04:42
27010005.PHK	26/02/2008 15:04:42
27010006.PHK	26/02/2008 15:04:42
27010007.PHK	26/02/2008 15:04:42
31100001.PHK	26/02/2008 15:04:42

Figure 5.4.1Data Review Menu

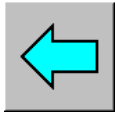
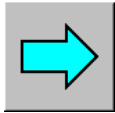

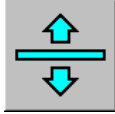

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

	25010002.PHK (Forward)	
--	---------------------------	--

Figure 5.4.2 Reviewing Data Menu

The file name for the data shown in the data area is shown in the information area.

The function of the keys associated with the icons on this menu:






 	These keys allow the operator to scroll left and right through the data, a feature which is commonly used to review a small portion of a long GPR scan.
	Step Back/Abort selected option
	The key associated with this icon adds horizontal cursors to the displayed data, which could for example be employed to highlight the depth of a known utility. When active keys 1 and 2 allow the depth of the cursor to be adjusted.
	The key associated with this icon allows the option of insert a vertical cursor onto the displayed data to mark a position of interest.

5.5 Data Delete Menu

The Data Deletion Menu is employed to remove old files from and is accessed via the key associated with the waste paper bin icon on the Main menu. The IMO menu is designed to allow fast site operations and minimise on site input required. A consequence of this is that the data is not intended for subsequent review. The data storage facilities should only store recently acquired information and data should be routinely deleted. The menu offers three deletion options. The operator may select one file for deletion by scrolling up and down through the list of files, or all of the previous day's files or all the files. The selection is made via icons with a folder. The folder is alone for one file, has a left pointing arrow for yesterday's file or a globe symbol for all the files. In all cases when one of these keys is pressed the operator is taken to the Confirm Data Deletion Menu shown in Figure 6.5.2. Pressing the key with the tick icon confirms the deletion, while the cross allows the selection to be changed or to exit to the Main Menu

Title	Created
10120001.PHK	26/02/2008 15:04:42
25010001.PHK	26/02/2008 15:04:42
25010002.PHK	26/02/2008 15:04:42
25020001.PHK	26/02/2008 15:04:42
25020002.PHK	26/02/2008 15:04:42
26020001.PHK	26/02/2008 15:04:42
26020002.PHK	26/02/2008 15:04:42
27010001.PHK	26/02/2008 15:04:42
27010002.PHK	26/02/2008 15:04:42
27010003.PHK	26/02/2008 15:04:42
27010004.PHK	26/02/2008 15:04:42
27010005.PHK	26/02/2008 15:04:42
27010006.PHK	26/02/2008 15:04:42
27010007.PHK	26/02/2008 15:04:42
31100001.PHK	26/02/2008 15:04:42

Figure 5.5.1The Data Delete Menu

	These keys allow the operator to scroll up and down through the list of files to select one file for deletion.
	
	The key associated with this icon selects one file for deletion selected by scrolling up and down through the list of files using the above keys.
	This key selects all the data generated the previous day for deletion.
	This button selects all the IMO style data on the E-Spect for deletion.

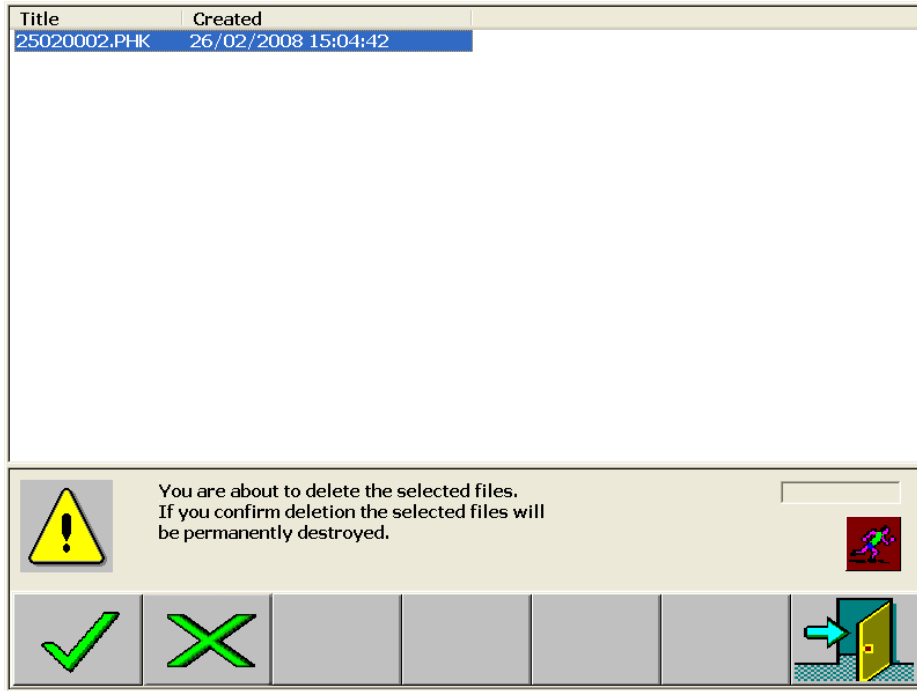




Figure 5.5.2 The Confirm Data Deletion Menu

	Confirm data deletion
	Abort data deletion

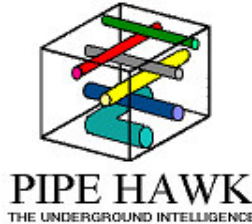
Quick Reference – “CRIB” Cards

PLEASE NOTE

The following pages are provided as a quick reference aid for new operators. They should not be used without first reading the preceding Operators Manual.

6.0 PIPEHAWK IMO QUICK REFERENCE GUIDE

Main Menu



Power: A battery icon is situated on the right hand side of the display. The battery life is graded from **Blue** for fully charged to **Red** for low power. **When the indicator reaches Red the battery must be replaced.**

Tools menu:



Once in the **Main Menu** select button one to access the **Tools options:**

This will allow you to access

Display Options (Button 2)

Depth of Penetration (Button 4)

Exit to the Main Menu (button 7).



Button 1



Button 2



Button 4



Button 7

Displays

In the **Display Options** menu:

Option:



Select between colour or Black and White screens (button 1). (The screens scroll i.e. Colour → Black & White → Colour).

Select the display scale (button 3). This sets the distance displayed on the screen at any one time. (x1=40m and x8=5m, this again scrolls through all the scales).



Button 1



Button 3

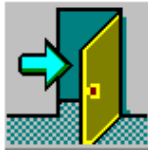
Depth of Penetration Option:

With **Depth of Penetration** (button 4) you can select shallow or deep antenna. Pressing button 4 whilst in the **Tools Menu** allows this selection (this again scrolls as before, deep → shallow → deep).

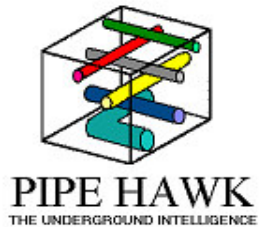


Button 4

Exit to Main Menu



Main Menu



Data Collection Menu:

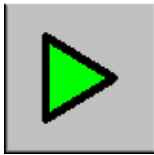
Once in the **Main Menu** select button 2, this will allow you to collect data.



Button 2



Scan Direction Options:



Once in the **Data Collection Menu** you have the choice of collecting the data forwards, button 2, or backwards, button 1. You can also exit back to the **Main Menu**, button 7.



Button 2



Button 2

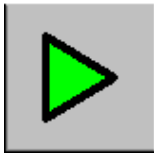


Button 1



Button 7

Collect Data Option:



After travel direction is decided (button 1 or 2), a new screen will appear. The e-Spect is now in **Data Collection Mode**. (NB: Data will not appear on the screen until a distance greater than 0.25m has been travelled, in both forward and backwards direction).



Button 2



Button 1

Over Speeding:



If whilst in Data Collection mode the operator pushes the e-Spect too fast, the image of someone running will flash red and data collection will cease.



Running Image

Marker Option:



Whilst collecting data you have the option of inserting a marker on the screen. This marker can be used to highlight any points of interest that appear in the data. This can be achieved by pressing button 3, whilst collecting data. These markers can be added or removed throughout this mode simply by pressing button 3.



Button 3



Button 3

Cursor Option:

If a target is located whilst in data collection mode, a cursor can be introduced onto the screen. All that is required is to change the direction of the e-Spect; this will cause a cursor to automatically pop up on the screen. To remove the cursor, simply continue to travel in the original direction.

Stopping Data Collection:

To stop Data Collection at any time simply press button 5. After pressing stop in the data collection mode you are immediately taken to a **Data Review Option.**



Button 5



In data collection mode it is possible to add horizontal cursors to indicate the depth of known utilities. Press button 5 to add this line and buttons 1 and 2 to move the lines up and down the screen



1
2

This button cycles between red and green horizontal cursors.

Adds an associated depth to the horizontal cursor.



NOTE: The depths expressed are an indication ONLY. While interpolation of depth between two known objects are likely to be reasonable accurate over short distances. EXTREME CARE must be exercised during any excavation.

Data Review Mode:

Within this mode you can only review the data just collected. Buttons 1 and 2 allow you to scroll through the collected data backwards and forwards respectively. The markers initially put into the collected data will also appear; these can be removed by pressing button 5.



Button 1

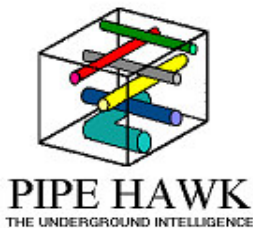


Button 2



Button 5

Main Menu



Review Data Menu:



If at any stage previously collected data needs to be reviewed, it can be recalled by pressing button 4. After this button has been pressed, buttons 1 and 2 can scroll through the data and highlight the desired file.

Once the file is highlighted in **Blue** confirm this action by pressing button 4. The desired data should now appear on the screen.



Button 4



Button 1



Button 2



Button 4

Data Review Mode:

Buttons 1 and 2 allow you to scroll through the collected data backwards and forwards respectively. The markers initially put into the collected data will also appear. These can be removed by pressing button 5.

(NB: Each data set has its own unique title once collected i.e. "21010008.PHK", followed by the date and time it was collected. These are automatically created as soon as the scan direction icon is pressed).



Button 1



Button 2



Button 5

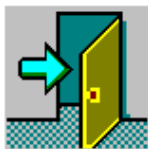


Button 1

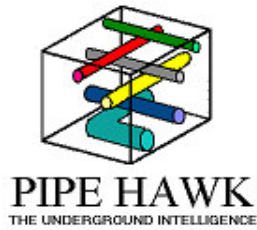


Button 2

Exit to Main Menu



Main Menu



Deleting Data:

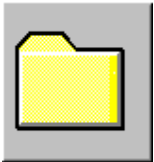
It is recommended that data is deleted from the e-Spect after use. To access deletion methods press button 6.



Button 6

Single File Deletion:

Scroll up and down using buttons 1 and 2 until the desired file is highlighted.



Button 1



Button 2

Press button 3 and you will be asked to confirm selection (press button 1). Confirm if happy or press button 7 to return to the **Main Menu**.



Button 3



Button 1



Button 7

Previous Day Deletion:

Select button 5 to delete the previous data.

(NB: This will delete all the previous day's data if confirmed). After pressing button 5 you will be asked to confirm selection (press button 1, confirm if happy or press button 7 to return to the **Main Menu**).



Button 5



Button 1



Button 7

All Data Deletion:

Select button 6 to delete all the data on the e-Spect.

(NB: Once confirmed this will empty the e-Spect of all collected data). After pressing button 6 you will be asked to confirm (press button 1). Confirm if



Button 6



Button 1

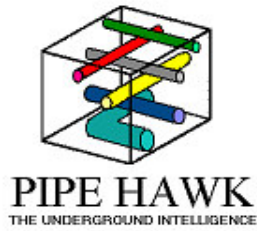


happy or press button 7 to return to the **Main Menu**.



Button 7

Main Menu



Powering e-Spect Down:

To shut the e-Spect down press button 7, to confirm press button 1.



Button 7



Button 1

To return to the **Main Menu** press button 7.



Button 7
