

Operating Manual for Transportable Estuarine pH Instrument

**R&D Technical Report
E96**

Operating Manual for Transportable Estuarine pH Instrument

R&D Technical Report E96

D Pearce

Research Contractor:
CCMS Plymouth Marine Laboratory

Further copies of this report are available from:
Environment Agency R&D Dissemination Centre,
c/o WRc, Frankland Road, Swindon, Wilts SN5 8YF



tel: 01793-511711 fax: 01793-514562 e-mail: publications@wrcplc.co.uk

Publishing Organisation

Environment Agency
Rio House
Waterside Drive
Aztec West
Almondsbury
Bristol
BS32 4UD

Tel: 01454 624400 Fax: 01454 624409

©Environment Agency 1999
ISBN: 1 85705 253 6

All rights reserved. No part of this document may be produced, stored in a retrieval system, or transmitted, in any form or by any means, electrical, mechanical, photocopying, recording, or other wise without the prior permission of the Environment Agency.

The views expressed in this document are not necessarily those of the Environment Agency. Its officers, servant or agents accept no liability whatsoever for any loss or damage arising from the interpretation or use of the information, or reliance upon views contained herein.

Dissemination status

Internal: Released to Regions
External: Released to the Public Domain

Statement of use

This report is aimed at those interested in the precise measurement of pH in estuarine waters. It is to be used in conjunction with a portable pH meter that has been developed jointly between CCMS Plymouth Marine Laboratory and the Environment Agency.

Research Contractor

This report was produced under R&D Project E1-028 by:

CCMS Plymouth Marine Laboratory
Prospect Place
West Hoe
Plymouth
PL1 3DH

Tel: 01752 633100 Fax: 01752 633101

Environment Agency Project Manager

The Environment Agency's Project Manager for R&D Project E1-028 was:
Andrew Wither - Environment Agency, North West Region

CONTENTS

Executive summary	vi
Keywords	vii
Glossary of Terms	viii
1. Introduction.....	1
1.1 Who developed the instrument?	1
1.2 Why use this instrument to measure pH?	1
2. Overview	2
2.1 Hardware.....	2
2.2 Software	6
3. Installation of pH system hardware	10
3.1 Positioning	10
3.2 Water and power supply requirements.....	10
3.3 Power and electronics cabling.....	10
3.4 Earthing.....	10
3.5 Tubing and connectors	11
3.6 Inserting electrodes	11
3.7 Purging air from the reference system	11
3.8 Use of Serial (COM) ports	12
3.9 Powering up the instrument	12
4. Software Operation.....	13
4.1 Start-up procedure.....	13
4.2 Buffer calibration <F7>	15
4.3 Continuous logging <F5>	16
4.4 Batch sample mode <F6>	17
4.5 Transportable pH Data Acquisition	18
5. Data output file.....	20
5.1 Specifications	20
5.2 Transfer to Microsoft Excel	21
5.3 Recalculating data using another electrode calibration.....	21
6. Storage and Maintenance.....	22

6.1 Electrodes	22
6.2 Cables and connectors.....	23
6.3 pH Cell	23
6.4 Reference electrode cell	23
6.5 Tubing	23

7. Troubleshooting	24
7.1 Noisy readings of electrode potential	24
7.2 Continuously rising (or falling) temperature in pH cell while logging	24
7.3 Reference cell temperature control lost	24
7.4 pH ‘spike’ on data every ten minutes.....	25

8. Overall Specifications	26
--	-----------

9. Typical Operational Procedure	27
---	-----------

Figures.....	28
---------------------	-----------

Appendix A: Preparation of TRIS Buffers

Appendix B: Trial Run in the Tamar Estuary

Appendix C: Raw Data for the Trial in the Tamar Estuary

EXECUTIVE SUMMARY

Operating Manual for Transportable Estuarine pH Instrument

The Environment Agency, and one of its predecessor the National Rivers Authority (NRA), has recognised that pH measurements made in brackish and saline waters using conventional pH systems are not accurate enough to determine unionised ammonia levels with the accuracy necessary for robust investment decision making. Over the past nine years approximately £450k had already been spent on developing improved theoretical models and new field equipment to rectify this situation.

The Natural Environment Research Council's Centre for Coastal and Marine Studies (CCMS) based at the Plymouth Marine Laboratory (PML) developed for the Environment Agency an instrument based on a capillary liquid junction electrode which met the design criteria. However, its size demanded permanent installation and being mains powered was suitable only for larger survey vessels. Ammonia toxicity is of greatest concern in the upper reaches of estuaries, which are generally not accessible to large craft. Therefore, there was an urgent requirement for a rugged, battery operated, portable pH instrument that would still afford the accuracy and stability of the existing capillary junction systems but can be used from small craft and temporary bank-side locations.

The Environment Agency (EA) and Plymouth Marine Laboratory (PML), to address this requirement undertook a jointly funded collaborative project.

The objective of the project was to design and produce precision portable instruments able to measure pH to an accuracy of ± 0.05 pH units to enable accurate determination of unionised ammonia concentration in waters of salinity 1-40 PSU. The preferred approach was to develop the capillary liquid junction technology, but reducing the physical size, weight and power consumption, to produce a portable instrument that would operate through a tidal cycle from a 12V lead-acid leisure battery.

- This project was based on proven technology (NRA/EA R&D projects 602 & 452) which is being routinely and successfully used aboard the Agency's coastal survey vessels.
- The portable instruments are envisaged as providing the bulk of the Agency's field pH results in the future.
- The survey vessel mounted liquid junction pH instruments, developed previously, would fulfil the role of 'reference' instruments within the Agency, providing a definitive comparison.

As a result, five transportable pH instruments were constructed (4 for Agency use and 1 for PML), all meeting initial specifications and based on technology developed for the survey vessel instruments. The instruments are self-contained, requiring just an external 12V battery and a pumped water supply. A dedicated submersible pump is supplied with the instrument. An interface is provided for input from a GPS supplying position data and UTC time. The pH is measured to an accuracy of better than ± 0.02 units.

Each instrument is operated through a purpose-built embedded computer using a standard keyboard. The software has been designed for ease-of-use, with a minimal requirement for user interaction required to obtain quality pH and temperature data. At the end of a survey the data are readily down-loaded into a spreadsheet for analysis and presentation.

A comprehensive Operating Manual is provided together with a Technical Design Manual for the instrument, the latter confidential to PML and the Agency.

The successful outcome of this project has positioned the Agency as leading exponents of the technology required for the assessment of the toxic impacts of ammonia in saline waters. This is an area of science that has suffered due to the poor pH accuracy of conventional meters. The new instrument will generate much better quality pH data and therefore will help improve the understanding of ammonia as a pollutant.

With an improved knowledge of the distribution of unionised ammonia there will be much greater confidence in the planning processes leading to investment decisions on the need for nitrification at sewage treatment works, ammonia removal at industrial sites and catchment management measures to control diffuse inputs.

KEY WORDS

pH, ammonia, toxicity, saline waters, instrumentation, measurement

GLOSSARY OF TERMS

ADC	Analogue-to-digital converter. Takes a analogue voltage and converts it to a digital representation for computer analysis.
Ag/AgCl electrode	A reference electrode with a silver wire coated with silver chloride.
DIO	Digital input/output. On/off 'switches' used to control events (e.g. operate valves).
Electrode cell	An electrode cell consists of two electrodes that enable a potential to be measured between them. In this case the electrodes are hydrogen and reference. After calibration, the pH of a solution can be calculated from the measured potential between the hydrogen and reference electrodes.
Free diffusion liquid junction	This special type of liquid junction relies on making a liquid/liquid boundary in a glass capillary. The two liquids are the seawater sample and the much more dense 2.5M potassium chloride. Free diffusion liquid junctions can be renewed as necessary and are extremely reproducible.
Hydrogen electrode	These electrodes have a special glass membrane that is permeable to hydrogen ions. The potential of the electrode is related to the activity of hydrogen ions in solution.
Liquid junction	Liquid junction is the salt bridge between the internals of the reference electrode and solution to be analysed.
NMEA0183	Data transfer protocol for GPS receivers. The Transportable pH software uses the 'RMC' string for date, time and position.
PCMCIA	Personal computer standard for credit card-size plug-in cards. These can be hard disk, RAM, communications, MODEM or data acquisition cards.
pH	pH is a measure of acidity/basicity of a solution and is given by : $\text{pH} = -\log\{\text{H}^+\}$ where $\{\text{H}^+\}$ is the activity of free hydrogen ions in solution.
pH buffer	Buffers are used to calibrate the pH electrodes. They have very well defined pH values which can be calculated at any given temperature of measurement.
PRT	Platinum resistance thermometer.
Reference electrode	A reference electrode is required to complete the cell with the pH electrode. A good electrode has a constant potential and a low temperature coefficient.
Salt bridge	The hydrogen and reference electrodes must be in ionic contact and salt bridge is used for this. For this instrument the salt bridge is 2.5M potassium chloride in a small PTFE capillary.

1. INTRODUCTION

1.1 Who developed the instrument?

The Transportable pH Instrument has been jointly developed by CCMS Plymouth Marine Laboratory and John W. Wood (Ruthern Instruments Ltd) with partial funding from the Environment Agency (EA). Together with four PML pH Instruments permanently mounted on four EA Coastal Survey vessels and a state-of-the-art ammonia speciation model (also developed at PML) it forms part of the current Environment Agency initiatives on ammonia containing effluent discharges and fish toxicology.

1.2 Why use this instrument to measure pH?

Current procedures for measuring pH, whether in the field or laboratory, generally rely on the use of glass membrane hydrogen electrodes and conventional reference electrodes. In an estuary, where the ionic strength is constantly changing, an unreproducible error in liquid junction potential is introduced at the reference electrode which affords drifting and imprecise pH readings. A research programme was therefore undertaken to develop an Estuarine pH Instrument to overcome these problems and afford a system that is both precise and easy to use (for further information see R&D Note 429). Four instrument have since been commissioned on EA Coastal Survey vessels and have been in operation since 1996 (see Operating Manual for PML Estuarine pH Instrument, 1996).

The flow-through pH cell was designed to contain a highly reproducible free-diffusion liquid junction which can be used in conjunction with a conventional reference electrode. Special pH buffers based on artificial seawater and sodium chloride (NaCl) are employed which offer further improvements in performance and permit longer times between calibration. The electronics package has been specifically designed for this application and purpose built software has been developed. The embedded computer controlled Transportable pH Instrument is fully automated, designed to operate from an external 12V leisure battery and can acquire pH data with a stability of $\pm 0.02\text{pH}$ at 10 second intervals.

2. OVERVIEW

The complete instrument contains a number of components (Figures 1 and 2). The pH flow-through cell contains two glass hydrogen electrodes, a platinum resistance thermometer (PRT) and a glass capillary for the free-diffusion liquid junction. Sample water flows through the pH cell when a solenoid valve is actuated (V1). Operating valve V2 drains the cell. The reference electrode is in a small plastic cell mounted inside a block of aluminium which has Peltier heat pumps attached to maintain the set point temperature (typically 20°C). The salt bridge between the reference electrode compartment and the pH cell consists of potassium chloride (KCl) solution in a small diameter PTFE tubing. A pressurised potassium chloride reservoir is provided to flush the liquid junction when the small solenoid valve (V3) is operated. Buffer solution is transferred into the pH cell automatically by a peristaltic pump.

The electronics package consists of very low noise, high impedance inputs for the electrodes, high precision temperature measurement, solenoid valve control, reference electrode temperature control and peristaltic pump operation. National Instruments LabVIEW software running on the embedded PC, fitted with a National Instruments PCMCIA ADC/DIO card, provides control and data acquisition.

2.1 Hardware

The following sections should be read with reference to figures 1 and 2.

2.1.1 Embedded PC and keyboard

The embedded PC was specially designed and manufactured for the Transportable pH Instrument. It is housed in a painted IP65 stainless steel enclosure.

The main specifications of the computer are:

- 586DX processor
- Clock speed 133MHz
- 24MB solid state Disk-On-Chip
- 16MB RAM
- 640x480 VGA display
- PCMCIA type II slot
- Two RS232 serial ports
- Windows 3.1/DOS 6.22
- Internal battery backup for computer only (10 minutes minimum when fully charged)
- IP65 enclosure

The computer connects to the valve/pump housing (from where it derives its power supply) and the analogue electronics box via cable glands. Sockets are provided for connection to the COM ports and for the keyboard. There is an on/off switch and LED indicators for internal battery charging (green) and computer on (red).

If the power supply is removed from the instrument, the computer continues to operate using the internal back-up battery. However, under this condition, the display is blank.

Please note: when operating from the internal backup battery, an area of the enclosure below the display gets hot and contact should be avoided!!

Interfacing with the embedded PC is via a rugged Storm 1100 Series full QWERTY keyboard which has an IP65 environmental rating.

For further information on the PC, please consult the TPC486/586 Embedded PC User Manual and the Embedded PC for Field pH Instrument Hardware Design Specification.

2.1.2 PCMCIA ADC/DIO card

The Transportable estuarine pH instrument uses a proprietary National Instruments DAQCard-700 for communications. It contains the following functions:

12 bit multichannel analogue-to-digital converter (8 differential inputs)

8 bit digital (TTL) output port

8 bit digital (TTL) input port

Two 16 bit counter/timer channels

2.1.3 Power supply and monitoring

The instrument has been designed to run on a 12V lead-acid leisure battery and this is the preferred power supply for field work.

Simple power supply supervision is included which indicates in software when the incoming supply is below the design limit of 11V. Supplies below 11V will prevent proper operation of the system, supplies above 14V can lead to damage through overheating, if sustained. The system is protected from supplies above about 16V (and reverse polarity connection of the supply) by a fast acting avalanche diode and 6.3A anti-surge fuse.

In addition, the current drawn, hours of use and amp-hours consumed are indicated to help monitor battery usage.

Alternatively, a 12V D.C. power supply capable of supplying 5A, may be used.

2.1.4 Analogue electronics box

The main analogue electronics is housed in a alochromed and painted IP65 alloy box mounted on the right side of the lid.

The unit contains a single printed circuit board which carries the main analogue signal processing circuitry. This includes very low bias current amplifiers, electronic gain switching and two precision differential amplifiers for H1-REF and H2-REF, two channel precision thermometer, precision temperature compensated voltage reference and the Peltier control circuitry for the reference block. All of the electronics circuitry is mounted on the board and all connections (except to the electrode input Fischer coaxial sockets) are by plug and socket making for easy maintenance. There are no user adjustments or trimming controls and there is no need to open the housing for calibration of the electronics. A desiccant (e.g. silica gel) is

inside the box lid to keep the internal atmosphere dry. This will prevent surface condensation on the printed circuit board which can cause drift and offset errors.

Gain for the glass and reference electrodes is automatic, under software control, and may be set to $\times 10$ for a nominal input range of $\pm 250\text{mV}$ or $\times 25$ for a nominal input range of $\pm 100\text{mV}$. The higher gain setting is used by default and gives a pH range of nominally six to nine. For pH values outside this range the lower gain setting is used with an accompanying drop in precision (see section 8, overall specifications).

To avoid upsetting and possibly damaging the electrodes, it is important to turn off the instrument when plugging and unplugging them. This will reduce the effects of charge injection to the high impedance buffer inputs which can lead to lengthy recovery times as the excess charge dissipates.

The reference block set point is determined by the electronics using a 99-position digital potentiometer. Therefore, 99 discrete temperatures are achievable. Due to changes in ambient conditions, the actual reference cell temperature may drift slowly with time. This is normal. Software monitors this change and adjusts the digital potentiometer position as required to maintain temperature within the required parameters (see section 4.5). A bi-colour LED (light emitting diode) indicator is mounted on the front panel. This indicates the status of the Peltier controlling circuitry. Red indicates heating of the aluminium block and green cooling. When the reference block is on temperature, the indicator is off.

The analogue box is connected to the computer and valve/pump housing by heavy duty IP68 Hirschmann connectors. The pH electrodes are connected using IP68 Fischer coaxial connectors and the PRTs with IP65 Triad 01 connectors.

2.1.5 Valve and pump housing

The three solenoid valves and the peristaltic pump are all housed in an IP65 alloy box. The peristaltic pump head is mounted on the lid. The solenoid pinch valve heads protrude through the lid to give ready access for tube fitting and replacement. With this construction there will be no need to open the box for any routine operation.

The power supply enters the box via a cable gland. There is a screw top fuse holder containing a 6.3A anti-surge fuse on the lid. A switch for the power supply to the remote sampling pump is also provided.

The box is connected to the computer and analogue electronics via cable glands.

2.1.6 Reference electrode compartment

The reference electrode compartment is mounted to the left of the pH cell. It consists of a small perspex cell for the Ag/AgCl electrode located in an insulated alochrome and anodised aluminium block. Heating or cooling of the block is achieved using Peltier heat pumps positioned on two opposite sides of the block. Thin thermally conductive and compressible gaskets are used to ensure good thermal contact between the Peltier devices and the L-shaped alochrome and anodised aluminium heat exchangers which transmit heat to and from the aluminium back plane. The temperature of the block is monitored by a PRT.

The reference cell set temperature is set at 20°C by default. This minimises condensation within the cell block and also reduces the power requirement of the Peltier pumps. In response to ambient conditions, the set temperature can be set in the range 10 to 25°C from software. Stable temperature control is achieved using hardware proportional/software integral feedback. The cell temperature is generally maintained to better than $\pm 0.15^{\circ}\text{C}$.

2.1.7 pH cell

The pH cell is fitted with two glass pH electrodes (H1 and H2) and a PRT. Sample water flows in through the bottom and out the top of the cell which also allows entrained air bubbles to escape. The cell should be kept free from the build up of sediment, dirt and grease. The base of the cell houses the glass capillary of the free-diffusion liquid junction.

2.1.8 Reference electrode electrolyte system

The reference electrode is connected to the pH cell by a capillary containing 2.5M KCl in deionised water. The KCl reservoir is sited in a box with a spring-loaded plate that constantly compresses the 'blood bag'. Flushing the liquid junction occurs when the small pinch valve is operated (V3).

The rate of flow of KCl depends on how full the bag is at a given time. If the flow rate is poor the bag should be refilled with KCl. First drain the old solution from the blood bag and fill using a syringe with 220g of 2.5M KCl solution.

2.1.9 Buffer

The buffer is pumped into the pH cell from a beaker using the peristaltic pump. To maximise pH accuracy, it is important that the buffer is maintained within about 5°C of that of the sample water when a calibration is due. This can be achieved by keeping the buffer in a tightly sealed container (to minimise carbon dioxide exchange with the atmosphere) submersed in the sample water.

2.1.10 Sampling pump

The Rule 360 bilge pump is mounted in an ABS T-piece. This is connected to its power supply from the valve and pump housing via in-line IP68 Buccaneer connectors and turned on and off by a rotary switch. Tubing should be connected from the pump outlet adapter to the upper quick release inlet coupling on the side of the instrument case.

2.1.11 Sample water filter (optional)

In certain cases, high loadings of particularly coarse sediments may block the tubing, especially at the solenoid valves and where there are other constrictions to flow. Some form of coarse filter may then be used to remove these particles from the flow of sample water to the pH cell. Fine sediment and particulates do not adversely affect the performance of the pH electrodes.

2.1.12 Tubing and connectors

The plumbing of the system is largely made up of soft wall silicone or Bio-Chem tubing of various sizes. The Bio-Chem tubing for the pinch valves and the silicone tubing for the peristaltic pump are specifically matched for optimum performance and should only be replaced with identical tubing (see section 11, Spare Parts list). The sizes of the other silicone tubing are not critical. It is important that the tubing that runs to waste is not restricted and has a larger diameter than the tubing used for water feed. The drain tubing is connected to the lower quick release outlet coupling on the side of the instrument case. The T-pieces used have been selected to minimise unnecessary restrictions in the tubing and should be replaced with the same size if possible. An one-way valve is placed on the outlet side of the pH cell. This allows the back draining of the pH cell.

Small diameter polytetrafluoroethylene (PTFE) tubing and Omnifit connectors are used for the reference electrode KCl salt bridge.

It is recommended that any damaged or blocked tubing should be replaced with that of the same dimensions.

2.1.13 Case

All the hardware, apart from the sampling pump, is mounted inside an ABS Pelican Case number 1550. The pH cell, reference cell block and analogue electronics are mounted on an anodised/alochromed aluminium sheet in the lid. The computer and valve/pump housing are screwed into the base of the case and stand on rubber feet.

The two quick release tubing connectors on the left side of the base of the case are for connection to the water supply (upper) and waste (lower).

2.2 Software

2.2.1 What is National Instruments LabVIEW?

LabVIEW is a high-level programming language designed to facilitate software development for data acquisition and control applications. It incorporates driver software for a range of PC and PCMCIA plug-in cards which allow communication to scientific and electronic instrumentation.

A software program written in LabVIEW is called a Virtual Instrument (VI). The front panel (the screen on the computer when you run a VI and in many cases depicts a true representation of the physical instrument) enables the user to interact with the instrument being controlled.

The code for the program is initially written on a block diagram by connecting input/output, computational and subVI components with 'wires' that direct the logic and data flow. The block diagram is then compiled into code that the computer can run and is subsequently hidden to the user.

Therefore the user interacts only with a Graphical User Interface front panel using the keyboard (and an optional mouse/trackball if attached). All communication with the scientific instrumentation is through the computer program and therefore hands-on control of the instrumentation is minimised.

2.2.2 Installation of the software on the Embedded PC

All the software required to run the instrument is pre-installed on the PC. To upgrade the software or re-install if a file has been inadvertently removed or corrupted, the software can be installed from floppy disks (three 1.44Mb disks) on a computer connected to the embedded PC via a null-modem serial link and using MS-DOS Interlink. (See section 2.2.4 for a description of using Interlink.)

Start INTERSVR.EXE running on the host computer and reboot the embedded PC to establish the network. Insert disk 1 into the floppy drive of the computer connected to the embedded PC. The software is installed by running SETUP.EXE on the floppy disk (normally the D: drive when running under Interlink) and following the instructions. From the Program Manager, press <ALT>-F followed by R to obtain the 'Run' dialog box. Type in D:\SETUP.EXE and press <ENTER>. The program loads quite slowly as the files have to be copied onto the embedded PC via the relatively slow serial link (compared to loading from a hard disk).

The software installation screen shows that the default installation directory is C:\. Using the <TAB> key select 'Finish' and press <ENTER>. The software will now be installed on the C: drive of the embedded PC. Swap the disks and press <ENTER> as required. When the installation has finished successfully press <ENTER> to exit the program.

The full installation consists of the LabVIEW Transportable pH Instrument executable file and defaults, LabVIEW drivers and NIDAQ software to communicate with the DAQCard-700. When the software was installed for the first time, the following lines were added to the [386Enh] section of the Windows SYSTEM.INI file:-

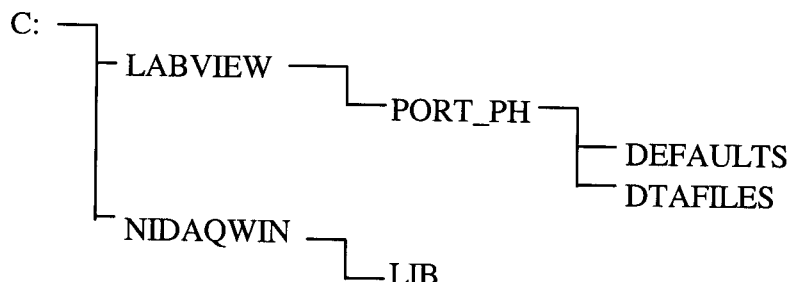
```
device=NIVISRD.386  
NIDirectDMAProgramming=yes  
NIRealModeSwitchDisable=no  
EMMExclude=E800-EFFF
```

The Transportable pH Instrument program must be run from within the Microsoft Windows 3.1 environment. Three icons are placed in the 'MAIN' group on the desktop, namely Transportable pH Instrument, DAQ Configure and uninstall. The icon for the Transportable pH Instrument may be changed by selecting the current icon and pressing <ALT>-<ENTER>. In the properties box, select 'Change Icon' and using the Browse option select PORTPH.ICO from the C:\LABVIEW directory. Pressing <ENTER> three times will return to the Program Manager showing the new icon. It is advised that the 'uninstall' icon be removed from the Program Manager.

The programs can then be run by selecting the appropriate icon using the arrow keys and pressing <ENTER>.

2.2.3 Directory structure and file management

Two new directories and associated sub-directories will have been created on the C: drive. The layout is as follows:



The LABVIEW directory is for the executable programs, icon file and system drivers. The DEFAULTS sub-directory contains initialisation files for the Transportable pH Instrument program and the buffer calibration files generated each time a buffer calibration is performed. The DTAFILES sub-directory is for the data acquisition files.

The NIDAQWIN and \LIB directories contain files required to configure the DAQCard-700.

All data files generated by the Transportable pH Instrument program are protected as much as possible to avoid data loss from computer or software failure (the battery backup within the embedded PC is intended provide short term protection in the case of power failure to the instrument. During data acquisition, files are opened, data are appended to them and they are then closed again. To minimise the number of writes to the C: drive (Disk-On-Chip), data is saved at 10 minute intervals during continuous logging and at the end of buffer calibration and batch experiments. Therefore, it is important to stop experiments by pressing <F10> and not by closing the Transportable pH Instrument program completely by using <CTRL>-Q.

The Transportable pH Instrument has the option to name the data files automatically, thus minimising interaction with keyboard. In the (preferred) auto-filename mode, data is saved in the following three types of data file which are generated by specific individual experiments:

YYYYMMDD.Lnn continuous logging experiment
YYYYMMDD.Xnn single batch sample experiment
YYYYMMDD.Bnn buffer calibration experiment

where YYYY is the year, MM is the month, DD is the day and nn is the consecutive numbering of the files from 01 to 99.

(These files are all stored in the C:\LABVIEW\PORT_PH\DTAFILES directory by default.)

The following file stores buffer calibration data. It is loaded each time you run the Transportable pH Instrument program and a new one is saved after a buffer calibration experiment:

YYYYMMDD.Cnn buffer calibration data file

(This is stored in the C:\LABVIEW\PORT_PH\DEFAULTS directory by default.)

When the Transportable pH Instrument software is run, it automatically loads the electronics calibration file C:\LABVIEW\PORT_PH\DEFAULTS\PORT_CAL.DEF (which should not be edited) and the initiation file C:\LABVIEW\PORT_PH\DEFAULTS\PPHSETUP.INI (see section 4.1.2).

2.2.4 MS-DOS Interlink

Interlink software connects two computers via serial (or parallel) ports and enables the computers to share disks and printer ports. This software will allow you to connect the embedded computer to a desktop or laptop computer and share files, e.g., transfer data files and update the pH software. Interlink re-directs requests for operations on an Interlnk client computer to one or more drives on the Interlnk server computer. The device driver must be loaded by a <DEVICE> or <DEVICEHIGH> command in the CONFIG.SYS file on both computers.

I.e.:

DEVICEHIGH = C:\INTERLNK.EXE

Connect the two computers together using a 7-wire, null modem adapter serial cable. From MS-DOS, run INTERSVR.EXE on the server computer. Switch on or re-boot the second (client) computer.

This will install the INTERLNK.EXE device driver in memory on the client computer and establish a connection with the server, redirecting any drives found on the server. These drives can then be accessed in the normal way either through MS-DOS or Windows File Manager

Please see the MS-DOS help files for more information in required.

3. INSTALLATION OF PH SYSTEM HARDWARE

3.1 Positioning

The ABS case, which contains all the hardware of the Transportable pH Instrument except for the sampling pump, is designed to be used on the deck or floor of a small boat or on some form of benching. It should be positioned close to the water supply and a suitable drain for waste water. There are two quick release tubing connectors located on the left hand side of the case, an inlet and a drain. These should be fitted with lengths of tubing of diameters which match the connectors and the drain tubing should be of larger diameter than the seawater supply tubing.

Every effort should be made to avoid use of the instrument in the close vicinity of noise generating electrical appliances such as outboard motors, etc., and wiring associated with these.

3.2 Water and power supply requirements

The Transportable pH instrument should be supplied with sample seawater at a rate of between one and two litres per minute. Ideally, this water should be fed from the Rule 360 bilge pump supplied with the instrument. However, it is possible to bleed off from a ship board clean water sample supply pumped at a higher flow rate.

The electronics requires a nominal 12V DC source capable of supplying up to about 5A (60 W). The instrument has been designed to run off a 12V lead-acid leisure battery and will accept a voltage between about 11 and 14V. A suitable mains adapter capable of supplying the required 12V/5A could also be used if desired. The internal backup battery of the embedded PC should be kept charged in case of power supply failure or for when changing the external battery.

3.3 Power and electronics cabling

The cable connectors should all be mated correctly and any screw threads tightened down securely (avoid over tightening). Special care should be taken to ensure that the external battery or power supply is connected correctly. There is only one way of connecting the interconnecting cables to avoid the possibility of damage to the electronics. Many of the connectors have a locating lug so that they only fit one way round. When installed, there is no reason to disconnect any of the connectors during normal operation and it is an advantage to leave them fitted as it protects the terminal pins from dirt and water ingress.

3.4 Earthing

A suitable earthing arrangement is necessary for the satisfactory operation of the pH instrument. As the pH cell is in contact with sea water, it is important that it is connected to the analogue ground of the system to avoid undesirable earth loops. The aluminium backplate provides this ground plane. The reference block is bonded directly to the backplate and the pH

cell is connected using low impedance wire braid. If the braid connection is loose or becomes disconnected, very noisy electrode potentials and temperature readings may be observed.

3.5 Tubing and connectors

If tubing or connectors need to be replaced then it may be necessary to fit the appropriate tubing in the solenoid pinch valves or peristaltic pump. For the pinch valves, this is facilitated by manually operating the valves (under software control) while inserting the tubing and drawing the tube back and forth a few millimetres to ensure good positioning. For the pump the tube should be clamped in the rear outlet and fed into the cams while the spindle is rotated manually. The tube can finally be clamped in the lower outlet and free rotation of the pump checked. **Do not operate the pump while its perspex cover is open.**

3.6 Inserting electrodes

3.6.1 Hydrogen electrodes

Place the pH cell side arm cap onto the stem of the hydrogen electrode. Gently push an o-ring up the stem and place the electrode carefully into the lower arm of the pH cell. Make sure that the tip of the electrode is protruding into main flow of the cell but is not fouling the cell wall, PRT or liquid junction capillary. The second electrode can then be fitted in the same way to the upper arm of the pH cell, ensuring that this electrode does not touch the lower one. When the two electrodes have been satisfactorily positioned, the caps can be tightened to seal the electrodes in the cell. **Do not over tighten!** An insufficient seal will be obvious if sample water travels up the sidearm when it flows through the cell. This can be easily rectified by tightening the cap slightly more.

3.6.2 Reference electrode

The reference electrode is particularly fragile and should be handled with care. Remove the reference cell (with the small PTFE tubings still attached) from the aluminium block. The reference electrode uses a cap and o-ring seal like the hydrogen electrodes. Slide the cap and o-ring onto the stem of the electrode, position it in the cell and tighten the cap. **Again, do not over tighten!** The cell should not be placed back into the aluminium block until the reference system is purged of air.

3.7 Purging air from the reference system

For the pH instrument to work effectively, the reference electrode system must not contain any air bubbles or blockages. Once the reference system has been purged of air, it should operate with a minimum of attention, providing that the tubing connectors are airtight and there are no splits in the tubing (most likely at V3 solenoid valve with excessive wear and tear).

The procedure for purging the system of air is as follows:

1. Check that the reference electrode electrolyte reservoir contains sufficient 2.5M KCl.
2. Position the reference electrode perspex cell so that it is upside down.
3. From software, manually operate V3 to allow KCl to fill the reference electrode cell. Ensure that any air bubbles in the tubing are drawn into the cell.

4. When the cell is almost full, position it in such a way that the air is bled out of the cell into the tubing to the pH cell.
5. Ensure that no air bubbles remain in the tubing between the reference and pH cells, paying particular attention to the fitting at the base of the glass capillary in the bottom of the pH cell.

If there is insufficient or no flow of KCl, either the reservoir is not sufficiently full or there is a blockage somewhere in the tubing or. The latter is likely to be due to a leak at a connector at which point it is possible for water to evaporate and KCl to crystallise. A systematic check of each connection should be undertaken to establish the location of the blockage. To minimise instrument down time, a new length of tubing could be substituted whilst the old length is being unblocked.

If KCl solution leaks from the reference electrode perspex cell and gets inside the cavity in the aluminium block the inside of the tube should be thoroughly rinsed and dried before reinserting the perspex cell. It is also important to cure the leak from the reference cell. If this is not done properly, electrode potential readings will be very noisy and the system will be totally unusable. This is due to problems with new earth leakage paths.

3.8 Use of Serial (COM) ports

There are two serial ports on the embedded PC designated COM1 and COM2. In general, COM1 is used for a pointing device when setting up the instrument in the laboratory. COM2 is used for GPS input in the field and for transferring data to another computer at the end of a fieldwork session.

A 7-wire serial cable is supplied with the instrument, together with two 9-way adapters. For transferring data between computers the orange null-modem adapter is used. The black male/male gender changer adapter is used for connecting a mouse or GPS. If using a GPS, it is important that the device is not connected until after Windows has started. If the GPS is connected whilst Windows is starting, it thinks that there is a mouse attached to that port and then it cannot be accessed for the GPS.

3.9 Powering up the instrument

When all the appropriate cables and plumbing, sample pump and electrodes have been connected up correctly, the power to the instrument should be applied. It is important that the GPS is not connected at this stage. The computer will boot up into Windows 3.1 and the reference cell will settle to an intermediate temperature of about 17°C. The GPS, if used should now be connected to COM2 port and switched on (it may be necessary to set the GPS NMEA0183 output to that required by the software in the PPHSETUP.INI file, see section 4.1.2.)

The instrument is now ready to run the Transportable pH Instrument software and use.

4. SOFTWARE OPERATION

4.1 Start-up procedure

The Transportable pH Instrument software program is loaded and run by selecting the icon in the Program Manager and pressing <ENTER>. The Transportable pH Data Acquisition and temperature control program is loaded and set running at the same time and requires no further user interaction except for very occasionally under specific circumstances (see section 4.5). To switch between the programs, use the 'WINDOW' menu (<ALT>-W) on the menu bar and the up/down arrow keys followed by <ENTER>.

Figure 3 shows examples of typical screen displays for information.

4.1.1 Loading buffer calibration file

The Transportable pH Instrument program will initially ask for the name of a buffer calibration file to use. The calibration data are kept in memory and used for all subsequent pH determinations until either (a) the program is stopped or (b) a buffer calibration experiment is carried out and this new data are then used. Generally it is applicable to load the latest buffer calibration file, either the last one of the previous day's work or the last one of the current survey. Loading the pH electrode calibration data on startup ensures that, should the program be inadvertently stopped or stop, data acquisition can be restarted with minimum delay and without further recalibration of the electrodes.

4.1.2 PPHSETUP.INI

The .INI file has following format with typical settings:

```
\Com port for GPS Receiver (default=2,9600,8,1,8192,n)
\number(1 or 2)
\baud rate(300, 600, 1200, 2400, 4800, 9600 or 19200)
\data bits(5, 6, 7 or 8)
\stop bits(1, 1.5 or 2)
\buffer size(minimum size 4096)
\parity(n,o,e,m,s)
GPS COM port:2,9600,8,1,8192,n
\Cell fluidics (times in milliseconds) (default=15000,20000,20000,100)
\Drain(1000 to 60000)
\Fill with Buffer(1000 to 60000)
\Fill with Sample(1000 to 60000)
\Flush LJ(100 to 1000)
Fluidics:15000,20000,20000,100
\Electrode slopes (H1_slope,H2_slope) (default=100.0%,100.0%)
Slopes:100.0,100.0
\Batch time(default=3 minutes)
Minutes for batch:3
\Other options (YES=1, NO=0)
\GMT?(NO)
```

\Auto filename(YES)
\GPS Input(NO)
\Flush LJ when logging(YES)
\10 seconds between logging readings (NO = 1 minute)(YES)
Options:0,1,0,1,1

The values for the GPS COM port, Fluidics, Slopes, Minutes for batch and Options (**in bold**) can be changed using NOTEPAD to suit the operating conditions. This must be done before running the Transportable pH Instrument software.

Further notes on some of the options:

For the GPS to function correctly, it is important that the COM port parameters should match that of the GPS receiver's NMEA0183 output. The 'RMC' string must be available from the GPS as the Transportable pH Instrument software obtains its date, time and position data from this string. Please see the particular GPS manual for further details.

Once the Transportable pH Instrument has been set up initially, the cell fluidics timings should not need changing.

The electrode slopes may be measured (see section 6.1.1) and entered if required.

It is important that the 'GMT?' parameter is set correctly for the data to be stored with the correct GMT time stamp. (At present the instrument has only been tested for UK time.)

If the auto-filenaming is 'OFF' then it will be necessary to input names of all data and buffer calibration files. It is recommended that auto-filenaming is kept 'ON'

4.1.3 Transportable pH Instrument front panel

The Transportable pH Instrument front panel has several components, some of which are displays of information and others control inputs.

The displays consist of indicators of pH, date and time, temperatures (pH and reference electrode cells), external battery/power supply condition, reference cell temperature in range and GPS ok. A representation of the cells and associated plumbing is also shown.

The software may be run in one of three operational modes, manual (0), semi-automatic (1) and automatic (2). The mode is selected using <PGDN>, entering the number 0 to 2 and pressing <ENTER>

In manual mode, the valves and peristaltic pump are operated by the buttons <F1> to <F4>. Pressing the button once will turn on the valve or pump and pressing it again will turn it off.

In semi-automatic mode, the valves and peristaltic pump are also operated by the buttons <F1> to <F4>. However, the length of time that a valve or the pump is operated is dependent on values in the Fluidics section of PPHSETUP.INI (see section 4.1.2).

The instrument will be mainly used in automatic mode. Here, a set of three buttons are used to select the type of experiment to perform, i.e., buffer calibration <F7>, continuous logging <F5> or batch sample <F6>. Pressing the required button drains the pH cell, fills it as required and flushes the liquid junction before collecting data.

The <MORE> button accessed an options screen by pressing <PGDN>. These options are the same as some of those in the PPHSETUP.INI and this allows them to be changed whilst the programme is running. They are:-

GMT?, time between logging readings, GPS input?, auto filename?, flush LJ (10 mins)? and minutes for batch.

The six parameters can be selected in order using the <TAB> button and then changed with the <SPACEBAR> or by typing the number of minutes for batch experiment. Pressing <ESC> returns to the main programme screen.

Reset valves <F12> is used if the logging software is still running during power failure or when the external battery is changed. As the valve holding circuitry uses power saving it is necessary to momentarily restore full 12V to the valves when the power has been reconnected. However, it is generally preferable to stop logging while changing the external battery.

An emergency stop button has been incorporated. It can be operated at any time (except for when the options screen is visible) by pressing <HOME> followed by <END>. This will stop the programme turning off all valves and the peristaltic pump.

Stop (<SHIFT>-<F10>) - stops the Transportable pH Instrument program.

4.1.4 Running experiments

The Transportable pH Instrument software incorporates three types of experiment, i.e., buffer calibration, continuous logging and batch sample. These are explained in detail below. To run an experiment, the appropriate button pressed. If continuous logging is chosen, the timing between data records (ten seconds or one minute) should be selected, using the <MORE> button, although this can be changed at any time during the data logging.

4.2 Buffer calibration <F7>

Calibration of the pH electrodes in TRIS buffer should be carried out at the start of a survey and subsequently at four to eight hour intervals to maintain the pH accuracy. A final calibration at the end of the survey is also recommended. Certainly, if the glass hydrogen or reference electrodes are changed for any reason a recalibration is essential. Procedures to make the buffers can be found in Appendix A.

If auto-filenaming is 'ON', no further interaction is necessary after ensuring sufficient buffer is in the beaker, selecting between seawater- and NaCl-based buffer (<F8>), deciding whether it is a new or repeat sample (<F9>) and pressing <F7>.

4.2.1 Output to data file

If auto-filenaming is 'OFF', the program asks for a filename to store the raw data during the buffer calibration experiment. For a suggested filename format see section 2.2.5.

4.2.2 Solution handling

V2 is operated to drain the cell, the peristaltic pump then fills the cell with TRIS buffer from the beaker and V3 is operated briefly to flush and renew the free-diffusion liquid junction.

4.2.3 Front panel

Two new displays are brought up in the centre panel. These are a text box showing the sets of raw data and a graph showing temperature drift of the pH cell with time.

Calibration can be finished early by pressing the <STOP> button (<F10>).

4.2.4 Data Collection

Calibration data are collected at ten second intervals over a period of between one and 10 minutes (the default is three minutes, although this is user configurable from PPHSETUP.INI before starting the program or using the <MORE> button). At the end of this time the pH of the buffer at the measured temperature is calculated by the software and the electrode potentials assigned to this pH.

4.2.5 Saving buffer calibration file

If auto-filenaming is 'ON', the software saves the new buffer calibration file automatically.

If auto-filenaming is 'OFF', the software asks to save the buffer data to a new calibration file. Again, see section 2.2.5 for a suggested filename format. This latest calibration can then be reloaded at any time should the Transportable pH Instrument program be stopped or stop unintentionally.

4.3 Continuous logging <F5>

Probably the most used of the two ways of recording pH data during a survey. In this mode of operation, seawater is continuously flowed through the pH cell and data are recorded to a file at intervals.

If auto-filenaming is 'ON', no further interaction is necessary after ensuring the sampling pump is switch on, selecting the time between readings (every 10 second or one minute) and whether the liquid junction is flushed every 10 minutes (using the <MORE> button) and pressing <F5>.

4.3.1 Time between readings

The time between readings is ideally selected before logging commences. Please note that this sampling rate may be changed at any time during data acquisition by pressing the <MORE> button. This feature may be particularly appropriate for looking at certain interesting sites in more detail without having to collect masses of data in areas where the pH is more stable.

4.3.2 Output to data file

If auto-filenaming is 'OFF', the program asks for a filename to store the raw data during continuous logging. For a suggested filename format see section 2.2.5.

4.3.3 Solution handling

After assigning the filename, V2 is operated to drain the cell, V1 is then operated to flush the cell with fresh seawater sample and V3 is opened briefly to renew the free-diffusion liquid junction. In continuous logging mode, V1 is left open so that seawater flows through the cell continuously. V3 is operated briefly every ten minutes whilst logging although there is an option to inhibit this if required (using the <MORE> button).

4.3.4 Front panel

Two new graphs are brought up in the centre panel. These show how calculated pH (for both hydrogen electrodes) and temperature vary with time.

4.3.5 Data Collection

The data displays are updated every ten seconds or one minute depending on the acquisition rate selected.

Logging can be finished by pressing the <STOP> button (<F10>).

4.4 Batch sample mode <F6>

In certain circumstances it may be useful to take the pH of a batch of seawater. In this mode of operation the pH cell is filled with a fresh sample of seawater and all the readings are taken on the static sample.

If auto-filenaming is 'ON', no further interaction is necessary after ensuring the sampling pump is switch on, deciding whether it is a new or repeat sample (<F9>) and pressing <F6>.

4.4.1 Output to data file

If auto-filenaming is 'OFF', the program asks for a filename to store the raw data during the batch experiment. For a suggested filename format see section 2.2.5.

4.2.2 Solution handling

After assigning the filename, V2 is operated to drain the cell, V1 is then operated to fill the cell with fresh seawater sample and V3 is finally operated briefly to flush and renew the free-diffusion liquid junction.

4.4.3 Front panel

Two new graphs are brought up in the centre panel. These show how calculated pH (for both hydrogen electrodes) and temperature vary with time.

Calibration can be finished early by pressing the <STOP> button (<F10>).

4.4.4 Data Collection

Data are collected at ten second intervals over a period of between one and 10 minutes (the default is three minutes, although this is user configurable from PPHSETUP.INI before starting the program or using the <MORE> button). The pH is calculated and data are then saved to the file.

4.5 Transportable pH Data Acquisition

As mentioned at the beginning of this section, a Data Acquisition and temperature control program is loaded and runs in the background when the main Transportable pH Instrument program is started. This program maintains the temperature of the reference electrode compartment at the required temperature (normally 20°C). It also scans all eight ADC channels of the DAQCard-700 approximately once every second and records the values in global variables for use by the Transportable pH Instrument software. This way of arranging the software avoids the problem of two programs accessing the DAQCard-700 at the same time.

The main control on the front panel is for setting the reference cell temperature set point. This control will only need changing in circumstances when ambient conditions are such that constant temperature cannot be maintained. In the winter the reference cell temperature should be lower (possible down to 10°C) and in summer a higher temperature may be needed (up to 25°C). Matching the reference cell Set Point as best possible to the average ambient conditions expected during a survey will minimise the power requirement, thus extending external battery life.

Other controls are:

Correction (either auto or manual) - in automatic mode the reference cell temperature is checked against the set point every five minutes. If the temperature has drifted outside the $\pm 0.15^\circ\text{C}$ tolerance then the digital potentiometer is adjusted one position up or down as required. This potentiometer position correction can also be entered manually, although this is not recommended.

Reset (<SHIFT>-<F5>) - this resets the 'Amp Hours' used and 'Hours Run' indicators in the Power Management display.

Stop (<SHIFT>-<F10>) - stops the Transportable pH Data Acquisition program.

Indicators are present to display electrode potentials and gain setting, pH and reference cell temperatures, reference cell temperature control details and power management information. There are also two graphs, one shows the history data for the reference cell temperature and the other the last 100 readings of the H1-LJ electrode potential acquired. These indicators can assist in determining the correct operation of the instrument and be used to help give an indication of remaining life of a 12V lead-acid leisure battery.

4.5.1 PORT_CAL.DEF

This file contains the electronics calibration data for the electrode input and PRT used by the Transportable pH Data Acquisition program. It is specific to a particular instrument and should not be edited or deleted. If corrupted it must be recovered from the backup copy and not just copied across from another instrument. As there are no adjustments or trimming controls within the instrument to drift off specification, there is not a requirement to periodically recalibrate. However, when the instrument is returned for service another calibration will be carried out and the file updated.

5. DATA OUTPUT FILE

5.1 Specifications

The Transportable pH Instrument software outputs TAB delimited data files in the following format:

Date	Date data set obtained (recorded from PC DATE function - corrected if GPS signal available)
Time	Time data set obtained (recorded from PC TIME function - corrected if GPS signal available)
Type	Type of data recorded (L = continuous logging; B = buffer calibration (NaCl or SW buffer indicated); E = single batch sample experiment)
Latitude	Current Latitude from GPS (or N/A if not available)
Longitude	Current Longitude from GPS (or N/A if not available)
pH_Cell_T	Temperature of pH cell
Ref_Cell_T	Temperature of reference electrode cell
Salinity	Salinity (not available with this instrument configuration)
H1_LJ	Potential measured between hydrogen electrode 1 and Ag/AgCl reference electrode
H1_LJ_sd	Standard deviation of 100 readings used to calculate H1_LJ
H2_LJ	Potential measured between hydrogen electrode 2 and Ag/AgCl reference electrode
H2_LJ_sd	Standard deviation of 100 readings used to calculate H2_LJ
H1_H2	Difference in potential between hydrogen electrode 1 and hydrogen electrode 2
H1_H2_sd	Standard deviation of 100 readings used to calculate H1_H2
pH (H1)	pH calculated from hydrogen electrode 1
pH (H2)	pH calculated from hydrogen electrode 2
Battery_Voltage	Voltage of external battery/power supply
Input_Current_(A)	Current drawn from external battery/power supply
Amp_Hours	Total Amp Hours used since instrument switched on - used to help monitor battery performance
Voltage ref	Stable voltage source within electronics used to monitor ADC performance

The TAB delimited buffer calibration file has the following format:

Date calibration file updated	(recorded from PC DATE function - corrected if GPS signal available)
Time calibration file updated	(recorded from PC TIME function - corrected if GPS signal available)
'Buffer Calibration Data'	
Latitude	Current Latitude from GPS (or N/A if not available)
Longitude	Current Longitude from GPS (or N/A if not available)
Date calibration data set obtained	(recorded from PC DATE function - corrected if GPS signal available)
Time calibration data set obtained	(recorded from PC TIME function - corrected if GPS signal available)

Temperature of pH cell
Buffer pH value calculated from TRIS buffer model in software
H1_LJ
H2_LJ

5.2 Transfer to Microsoft Excel

The data files to be analysed must be transferred to the hard disk of the desktop or laptop PC using Interlink (see section 2.2.4) before Excel is run. They are of TAB delimited format and may be loaded as text files into Excel (or other suitable programs) for data analysis and graphing purposes.

5.3 Recalculating data using another electrode calibration

A LabVIEW Program (Recalculate pH), which recalculates the pH data from the electrode potential readings, using an alternative, specified buffer calibration file, is supplied to run on a desktop or laptop PC (not the instrument's embedded PC). It is installed by running SETUP.EXE on the floppy disk and following the instructions. The software installation screen shows that the default installation directory is C:\LABVIEW. Select 'Finish' and the software will now be installed on the C: drive of the PC. Swap the disks as required. When the installation has finished successfully exit the program. The installation will create the same directory structure as used on the embedded PC (see section 2.2.3) and it is recommended that this is adopted.

The data files to be modified and the required buffer calibration files must be transferred to the hard disk of the PC used for the recalculation before the program is run. The program asks for a data file to modify and then the new buffer calibration file to use. The values of pH (H1) and pH (H2) are replaced with recalculated pH (H1) and pH (H2) values and the column headings modified accordingly. The date/time of the buffer calibration are in the headings and the file is saved under a new name supplied by the user. **Do not overwrite the original data file!!!**

6. STORAGE AND MAINTENANCE

6.1 Electrodes

Both the hydrogen and reference electrodes contain a silver wire coated with silver chloride. This coating is light sensitive and therefore exposure of the electrodes to sunlight should be minimised. The Fisher coaxial termination at the end of the cables should be kept clean and dry. Please also consult the instruction sheet supplied with each electrode.

6.1.1 Hydrogen electrodes

Care should be taken to avoid handling or damaging the glass membrane, which should not be allowed to dry out at any time.

It is recommended that the hydrogen electrodes are stored in TRIS buffer solution when not in use. If they are not to be used for a period of a week or more, the storage teat should be half filled with TRIS buffer and fitted over the glass membrane. The electrodes should then be stored safely, preferably in the polystyrene boxes they were supplied in.

If poor performance of an electrode is suspected (i.e., the two electrodes are not responding in a similar way), the reason for this has to be investigated. The membrane may occasionally become coated with an inhibiting film (in the case of estuarine pH work this is likely to be either grease/oil, particulates in the water or algae/biological material). For general cleaning a non-acidic cleaning solution such as 10% Decon 90 solution or Genklene should be used. Allow the electrode to stand in the solution for up to 20 minutes, rinse with deionised water, wipe dry with a clean soft cloth or tissue and place in TRIS buffer solution until required.

If this cleaning method does not return the electrodes to satisfactory performance, soaking in a solution of 0.1M hydrochloric acid in TRIS buffer/artificial seawater solution overnight might be necessary. Again, rinse with deionised water, wipe dry with a clean soft cloth or tissue and place in standard TRIS buffer solution until required.

Electrode performance may be evaluated by determining the response in two NBS buffers (e.g. pH7 and pH9.2) and the values obtained compared with the expected theoretical response. If necessary the measured electrode slopes may be entered in the PPHSETUP.INI

6.1.2 Silver/Silver chloride electrode

The silver/silver chloride reference electrode can be stored for long periods of time in 2.5M KCl solution. If for any reason the reference compartment has to be disassembled for more than a short period of time, the storage teat should be half filled with 2.5M KCl and fitted over the end of the electrode. As the electrode does not come into contact with sample water, contamination of the electrode and blockage of the ceramic frit junction (the most common cause of reference electrode failure) are highly unlikely. Therefore, the electrode should give long service and only a three monthly check on the level of the internal filling solution is required.

6.2 Cables and connectors

It is important that all the terminal pins and surrounding insulation of the connectors are kept clean and dry to avoid corrosion-induced noisy data. This is especially important for the coaxial plugs and sockets for the electrodes as mentioned previously. When the electrodes are not plugged in to the sockets on the pre-amplifier assembly, the caps supplied should be used to protect the sockets.

Any obvious sign of seawater aerosol on the cables and outside of connectors should be routinely wiped away. This will increase the overall reliability of the instrument and minimise the need to call a service engineer.

6.3 pH Cell

Like the hydrogen electrodes, the pH cell may also become contaminated with grease/oil from the seawater. This may be removed by dismantling the cell, soaking it in 10% Decon 90 solution and cleaning with a test tube brush before finally rinsing with clean water. If the contamination is not too bad, the cell could be filled with Decon solution, using the peristaltic pump and left soaking for up to about 30 minutes. The cell and tubing must be flushed thoroughly afterwards to remove all traces of the cleaning agent.

The bottom of the cell could also contain sediment which is too heavy to be flushed out of the top of the cell. Most of this can be removed by several manual fill/drain cycles from software. If this does not work satisfactorily, the cell will have to be dismantled and cleaned.

6.4 Reference electrode cell

There is very little maintenance on the reference electrode cell. Any obvious sign of seawater aerosol should be routinely wiped away and the cable connectors kept clean and dry.

6.5 Tubing

The plumbing of the system is largely made up of soft wall silicone or Bio-Chem tubing. The tubing is most likely to fail at the solenoid pinch valves and peristaltic pump. These lengths of tubing should be checked weekly and replaced if necessary. They could be reused by inserting them the other way round, providing that the wear is not excessive. Any tubing found to be damaged should be replaced with tubing with the same dimensions. This is particularly important for the Bio-Chem tubing for the pinch valves and the silicone tubing for the peristaltic pump which is specifically matched for optimum performance.

The small diameter PTFE tubing and Omnifit connectors used for the reference electrode KCl salt bridge should not need any maintenance except for checking that there are no leaks or blockages in the system.

7. TROUBLESHOOTING

7.1 Noisy readings of electrode potential

This is usually due to air in the reference electrode KCl salt bridge tubing or connectors, causing high resistance between the pH cell and reference electrode. Purge the air from the system (see section 3.7).

Another possible cause is that the earthing braid connections is loose or disconnected (see section 3.4).

If there is a leak in the reference capillary system, it is possible for water to evaporate and KCl to crystallise at this point. If the blockage is between the reference electrode and the pH cell then the high resistance causes noise. Furthermore, a blockage will not allow the liquid junction to be flushed. The reference plumbing should be dismantled and cleaned out or replaced. Reconnect all the tubing and finally purge air from the system.

If KCl solution has leaked from the reference electrode perspex cell into the cavity in the aluminium block it is important to dry it thoroughly before reinserting the perspex cell.

In very unlikely, extreme circumstances particulate matter may block the capillary in the pH cell. This should be flushed out by manually operating V3 for several second.

If rapid changes in pH occur at very low salinities, the hydrogen electrodes may take longer to settle to a stable reading. This is normal and does not necessarily indicate that user intervention is required.

7.2 Continuously rising (or falling) temperature in pH cell while logging

Flow to pH cell has been interrupted. This is generally due to a blockage in the tubing at the V1 solenoid valve and can be rectified by momentarily removing the tubing from the valve.

7.3 Reference cell temperature control lost

The Peltier devices cannot supply enough heating or cooling to the reference block under the existing ambient conditions. If ambient temperature is high, the Set Point should be increased to, for example 25°C. If ambient temperature is low, the Set Point should be decreased to, for example 10 or 15°C. **Changing the Set Point does not affect the performance of the pH instrument, providing that the reference cell temperature is stable and the pH electrodes are calibrated under the new conditions.**

Matching the reference cell Set Point as best possible to the average ambient conditions expected during a survey will minimise the power required, thus extending external battery life.

7.4 pH 'spike' on data every ten minutes

During continuous logging, the liquid junction is flushed every ten minutes. The small pulse of high concentration potassium chloride solution will disturb the glass membrane of the hydrogen electrodes. In most circumstances the hydrogen electrodes recover before the next reading of potential is taken. However, at extremely low salinities this recovery takes longer (perhaps up to 30 seconds) and some data should be rejected. The effect is most pronounced on the electrode closest to the capillary and the problem can generally be avoided by setting the data logging to every minute instead of every ten seconds.

8. OVERALL SPECIFICATIONS

pH (high precision/normal operation)

Precision: $\pm 0.02\text{pH}$

Accuracy: $\pm 0.02\text{pH}$

pH (lower precision/wider pH operating range)

Precision: $\pm 0.05\text{pH}$

Accuracy: $\pm 0.05\text{pH}$

pH range of operation

High precision: nominally 6 to 9pH ($\pm 100\text{mV}$ full scale output)

Lower precision: nominally 3.5 to 11.5pH ($\pm 250\text{mV}$ full scale output)

Temperature

Precision: $\pm 0.1^\circ\text{C}$

Accuracy: $\pm 0.1^\circ\text{C}$

Temperature of operation

Electronics: 0 to 45°C (non-condensing)

pH measurements: 0 to 25°C (sample water)

9. TYPICAL OPERATIONAL PROCEDURE

This section detail the operational steps required to conduct a data logging experiment, with buffer calibrations, from start to finish. It is assumed that the electrodes are in the cells, the liquid junction capillary has been purged of air and buffer is in the beaker. To switch between the programs, use the 'WINDOW' menu (<ALT>-W) on the menu bar and the up/down arrow keys followed by <ENTER>. An example of results and raw data from the Tamar Estuary on the 25-08-99, can be found in Appendix B and C respectively.

Step	Operation
1	Connect the instrument to an external 12V battery/power supply
2	Switch on the computer.
3	When the Windows 3.1 Program Manager is loaded, connect and switch on the GPS, if available.
4	Select the 'Transportable pH Instrument' icon in the Program Manager and press <ENTER>.
5	Select the buffer calibration file to load (generally the latest one to be stored).
6	Adjust options by selecting <MORE> button (press <PGUP>) if required.
7	Check GPS light is green if GPS operational.
8	Wait until the Data Acquisition and control software is controlling the temperature of the reference cell. (Adjust the Set Point if necessary.)
9	Select the appropriate buffer type <F8>. Select the 'Buffer Calibration' button by pressing <F7>. The pH cell will be drained, filled with buffer, the liquid junction flushed and the data recorded and stored.
10	Connect the sample water supply to the instrument and switch on the Rule 360 sample pump.
11	Select the 'Continuous Logging' button by pressing <F5>. The pH cell will be drained, sample water flow started, the liquid junction flushed and the data recorded and stored.
12	To stop logging, select the STOP button by pressing <F10>.
13	Turn off the sample water supply to the instrument
14	Repeat step 8 to recalibrate the electrodes.
15	Select the STOP button on the Transportable pH Instrument Front Panel by pressing <SHIFT>-<F10>.
16	Select the STOP button Data Acquisition Front Panel by pressing <SHIFT>-<F10>.
17	Press <Ctrl>-W twice. (This closes the two LabVIEW programs.)
18	Exit Windows.
19	Switch off computer.
20	Disconnect power from the instrument.
21	Download the data to another computer for analysis using MS-DOS Interserver/Interlink software.

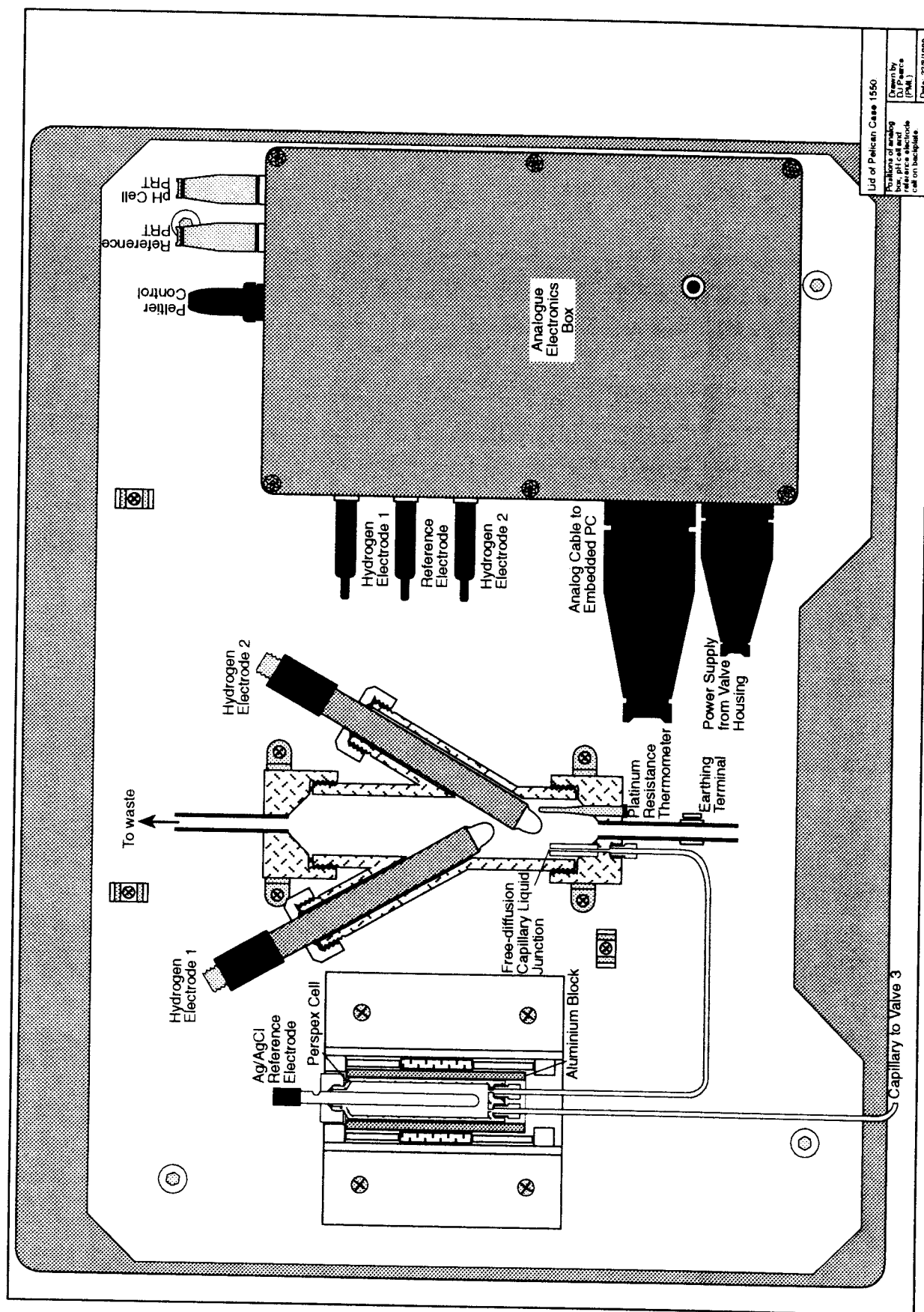


Figure 1. Components in lid of Pelican Case.

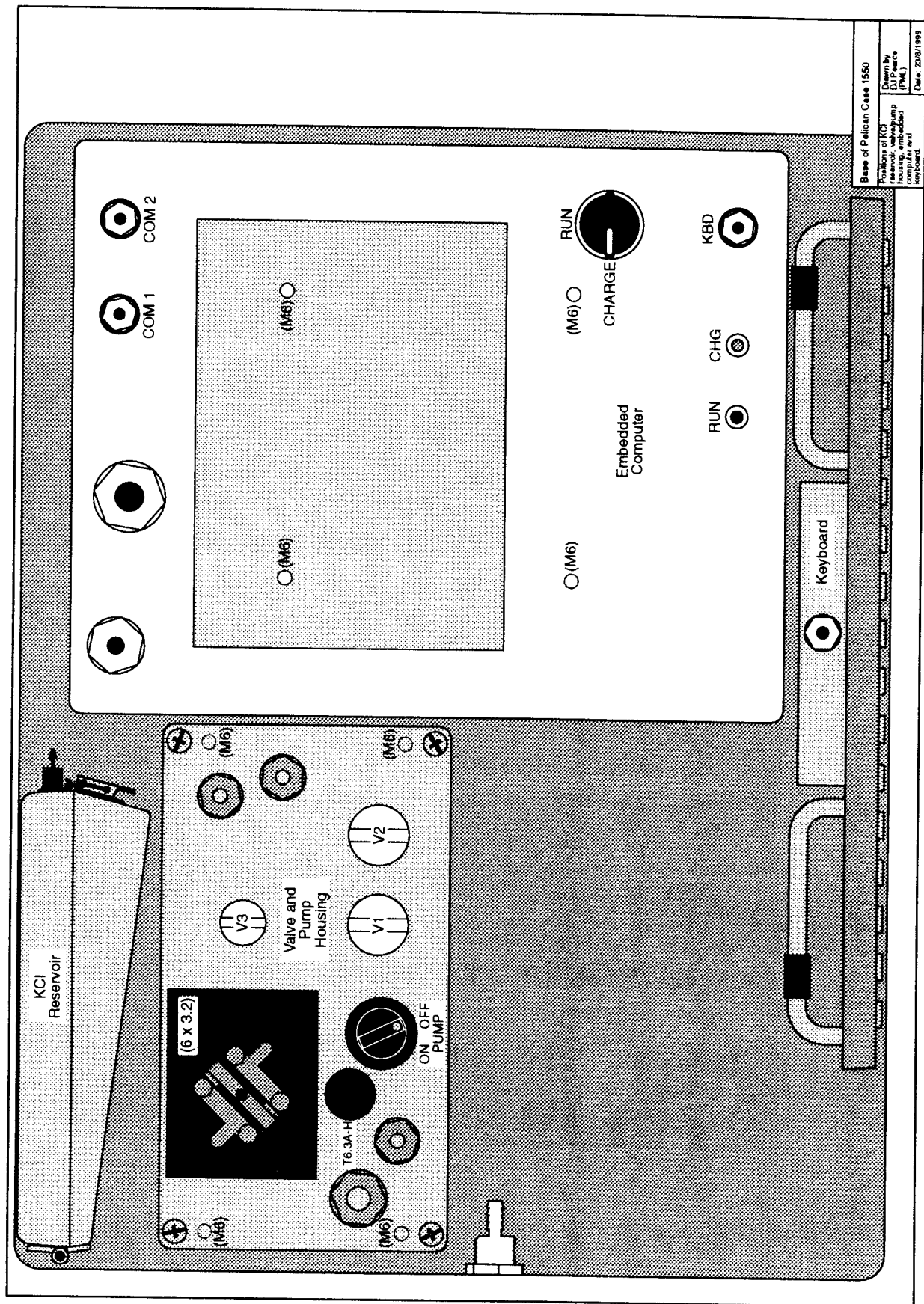
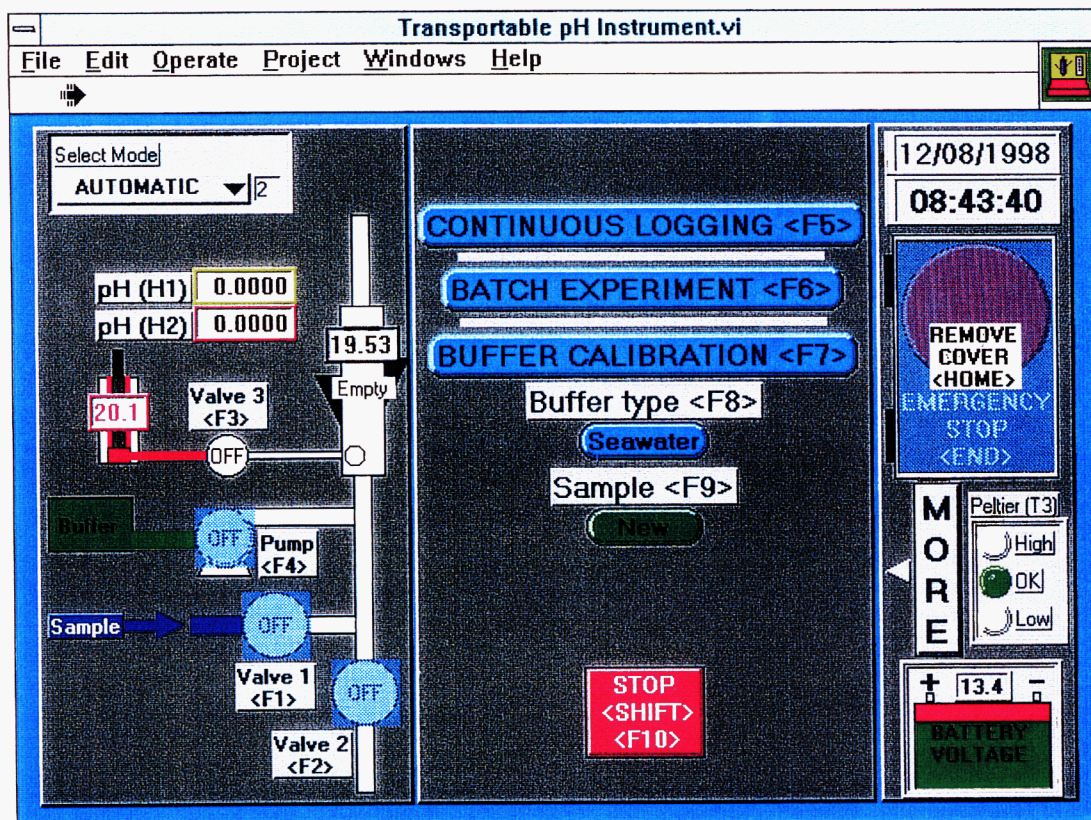
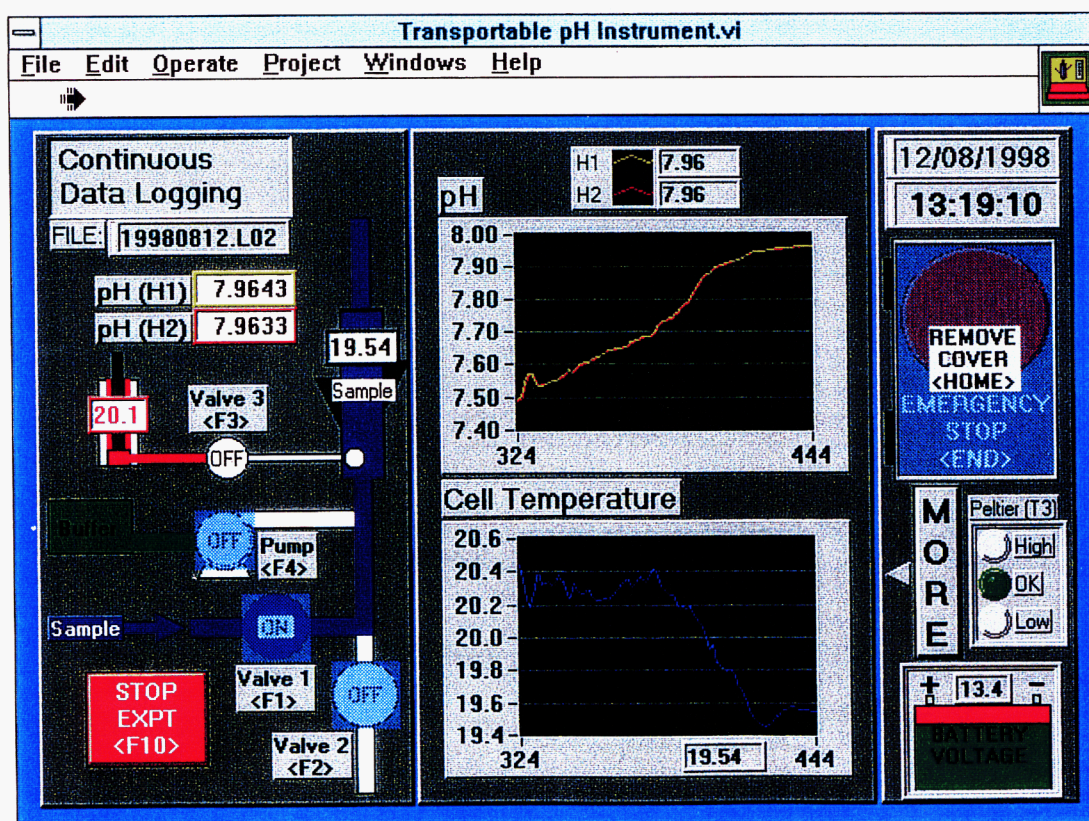


Figure 2. Components in base of Pelican Case.



(a) main menu



(b) during continuous data logging

Figure 3: Typical computer screen .

APPENDIX A: PREPARATION OF TRIS BUFFERS

20 salinity sea water/TRIS buffer

The chemical composition of the 20 salinity sea water/TRIS buffer is:

Chemical	g/dm ³ (25°C)	mol. wt.	mol/dm ³ (25°C)	molality
Sodium chloride	11.969	58.44	0.20481	0.20630
Sodium sulphate	2.322	142.04	0.01635	0.01646
Potassium chloride	0.441	74.56	0.00591	0.00595
Calcium chloride	0.885*	147.02*	0.00602	0.00606
Magnesium chloride	6.268**	203.31**	0.03083	0.03105
TRIS	4.061	121.14	0.03352	0.03376
TRIS HCl	5.282	157.60	0.03352	0.03376

* CaCl₂·2H₂O

** MgCl₂·6H₂O

The procedure for preparation of the 20 salinity sea water/TRIS buffer is as follows:

1. Boil three litres of deionised water for three hours. Cool and deaerate with nitrogen overnight (i.e. for at least 12 hours).[†]
2. Dry NaCl, Na₂SO₄ and KCl at 200°C for two hours.
3. Prepare 500ml each of 1mol/dm³ CaCl₂·2H₂O and 1mol/dm³ MgCl₂·6H₂O in deionised water. (These are stock solutions and should be stored in a fridge.)
4. Dry AgNO₃ at 120°C for two hours and prepare a 0.5mol/dm³ solution (21.234g to 250ml deionised water).
5. Standardise the CaCl₂ and MgCl₂ solutions using 0.2% aqueous sodium fluoresceinate as indicator (Vogel, p258).
6. Weigh and dissolve the NaCl, Na₂SO₄, KCl, TRIS and TRIS-HCl in about 700ml of deaerated water.
7. Measure CaCl₂ and MgCl₂ solutions by volume into about 200ml of deaerated water.
8. Mix the two solutions with stirring and make up to one litre with deaerated water in a Grade A volumetric flask.
9. Place in plastic container and store in a fridge.

[†] as an alternative to boiling and deaerating with nitrogen, purging the deionised water with helium for fifteen to twenty minutes should satisfactorily remove the carbon dioxide from solution.

20 salinity NaCl/TRIS buffer

The chemical composition of the 20 salinity NaCl/TRIS buffer is:

Chemical	g/dm ³ (25°C)	mol. wt.	mol/dm ³ (25°C)	molality
Sodium chloride	21.438	58.44	0.36684	0.37296
TRIS	4.023	121.14	0.03321	0.03376
TRIS HCl	5.233	157.60	0.03320	0.03376

The procedure for preparation of the 20 salinity NaCl/TRIS buffer is as follows:

1. Boil three litres of deionised water for three hours. Cool and deaerate with nitrogen overnight (i.e. for at least 12 hours).[†]
2. Dry NaCl at 200°C for two hours.
3. Weigh and dissolve the NaCl, TRIS and TRIS-HCl in about 700ml of deaerated water.
4. Make up to one litre with deaerated water in a Grade A volumetric flask.
5. Place in plastic container and store in a fridge.

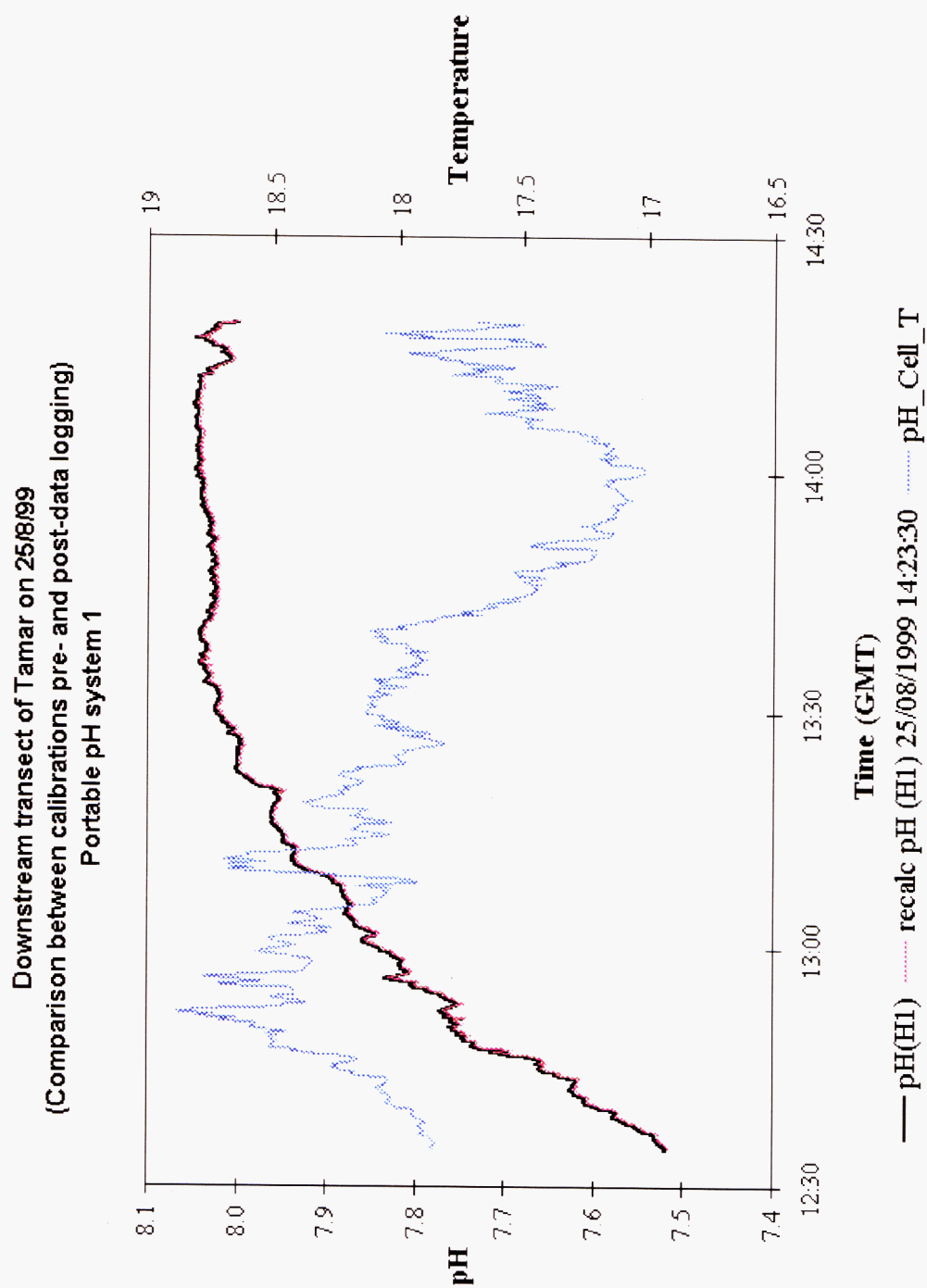
[†] as an alternative to boiling and deaerating with nitrogen, purging the deionised water with helium for fifteen to twenty minutes should satisfactorily remove the carbon dioxide from solution.

The storage life of TRIS buffers

There are two potential sources of degradation of TRIS buffers.

- 1 Due to their high pH, the buffers are particularly susceptible to absorption of carbon dioxide from the atmosphere. Therefore, exposure to the atmosphere should be minimised. This is best ensured by storing the buffers in an airtight container. The types of collapsible containers used to store photographic chemicals would seem the most appropriate.
- 2 Compared to inorganic phosphate buffers, the organic TRIS-based buffers are also prone to degradation by biological activity. To minimise this effect it is important to store the buffers in a cold, dark place, a refrigerator being ideal for this.

APPENDIX B: TRIAL RUN IN THE TAMAR ESTUARY



Appendix C: Raw Data for Tamar Estuary Trial

Date	Time	Type	Latitude	Longitude	pH_Cell_T	Ref_Cell_T	Salinity	HI_L_J	HI_L_J_sd	H2_L_J	H2_L_J_sd	HI_H2	HI_H2_sd	HI_H2_sd	pH(HI)	recalc pH (HI)	Battery_Voltage	Input_Current	Amp_Hours	Voltage_Ref
25/08/99	12:34:50	L	5027.394N	00413.667W	17.854002	20.102869	-9.99	-0.001912	0.000022	-0.001816	0.00002	-0.000695	0.000021	0.000021	7.519714	7.516644	13.257101	2.359765	10.9496	-1.506323
25/08/99	12:35:00	L	5027.399N	00413.651W	17.861216	20.099762	-9.99	-0.001884	0.000023	-0.001827	0.000024	-0.000667	0.000023	0.000023	7.519428	7.516352	13.259723	2.351807	10.95608	-1.506348
25/08/99	12:35:10	L	5027.403N	00413.638W	17.865246	20.098146	-9.99	-0.001888	0.000023	-0.001851	0.000022	-0.000637	0.000023	0.000023	7.519309	7.516232	13.25708	2.342651	10.96247	-1.506287
25/08/99	12:35:20	L	5027.407N	00413.623W	17.865509	20.095537	-9.99	-0.002028	0.000019	-0.001911	0.000016	-0.00118	0.000017	0.000017	7.521728	7.519649	13.261477	2.336792	10.96634	-1.506372
25/08/99	12:35:30	L	5027.414N	00413.612W	17.862757	20.09417	-9.99	-0.002137	0.000023	-0.001995	0.000023	-0.00142	0.000023	0.000023	7.52361	7.520538	13.264446	2.33374	10.97566	-1.506397
25/08/99	12:35:40	L	5027.424N	00413.600W	17.858976	20.095163	-9.99	-0.002353	0.000025	-0.002227	0.000024	-0.00142	0.000024	0.000024	7.525734	7.522535	13.260119	2.327881	10.98211	-1.506274
25/08/99	12:35:50	L	5027.432N	00413.588W	17.864948	20.092802	-9.99	-0.002421	0.000019	-0.002398	0.000023	-0.000682	0.000021	0.000021	7.528557	7.525489	13.265004	2.324341	10.98842	-1.506249
25/08/99	12:36:00	L	5027.447N	00413.574W	17.867187	20.092304	-9.99	-0.002494	0.000025	-0.002463	0.000023	-0.000632	0.000024	0.000024	7.52984	7.526759	13.259249	2.316772	10.99521	-1.50625
25/08/99	12:36:10	L	5027.455N	00413.564W	17.870049	20.089754	-9.99	-0.00252	0.000016	-0.002554	0.000012	-0.000634	0.000014	0.000014	7.530291	7.527127	13.264751	2.307129	11.00149	-1.506348
25/08/99	12:36:20	L	5027.471N	00413.551W	17.871714	20.089073	-9.99	-0.002554	0.000023	-0.002681	0.000017	-0.000637	0.000013	0.000013	7.530988	7.527855	13.266169	2.307739	11.00781	-1.506348
25/08/99	12:36:30	L	5027.487N	00413.541W	17.891071	20.08783	-9.99	-0.002553	0.000027	-0.002694	0.000023	-0.000637	0.000023	0.000023	7.530928	7.527855	13.266169	2.307739	11.00781	-1.506348
25/08/99	12:36:40	L	5027.497N	00413.534W	17.912842	20.090565	-9.99	-0.002579	0.000021	-0.002615	0.000023	-0.000637	0.000023	0.000023	7.531422	7.528354	13.266792	2.299438	11.02078	-1.506287
25/08/99	12:36:50	L	5027.503N	00413.524W	17.881369	20.08497	-9.99	-0.00307	0.000022	-0.002903	0.000019	-0.00167	0.000021	0.000021	7.533176	7.530096	13.266613	2.291626	11.02702	-1.506397
25/08/99	12:37:00	L	5027.508N	00413.516W	17.903761	20.08734	-9.99	-0.003261	0.000023	-0.003106	0.000022	-0.00165	0.000023	0.000023	7.533176	7.530096	13.266613	2.291626	11.02702	-1.506397
25/08/99	12:37:10	L	5027.513N	00413.514W	17.915577	20.084351	-9.99	-0.003608	0.000022	-0.00358	0.000015	-0.000638	0.000015	0.000015	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:37:20	L	5027.527N	00413.514W	17.922916	20.08596	-9.99	-0.003819	0.000023	-0.003789	0.000022	-0.000638	0.000023	0.000023	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:37:30	L	5027.536N	00413.514W	17.929916	20.08596	-9.99	-0.003819	0.000023	-0.003789	0.000022	-0.000638	0.000023	0.000023	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:37:40	L	5027.548N	00413.514W	17.935577	20.084351	-9.99	-0.003908	0.000023	-0.003878	0.000022	-0.000638	0.000023	0.000023	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:37:50	L	5027.561N	00413.514W	17.939607	20.08596	-9.99	-0.003908	0.000023	-0.003878	0.000022	-0.000638	0.000023	0.000023	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:38:00	L	5027.565N	00413.513W	17.947215	20.083605	-9.99	-0.004145	0.000023	-0.004111	0.000023	-0.000638	0.000023	0.000023	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:38:10	L	5027.577N	00413.509W	17.901894	20.084723	-9.99	-0.004374	0.000024	-0.004318	0.000023	-0.000638	0.000023	0.000023	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:38:20	L	5027.587N	00413.507W	17.910894	20.084723	-9.99	-0.004374	0.000024	-0.004318	0.000023	-0.000638	0.000023	0.000023	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:38:30	L	5027.601N	00413.509W	17.915081	20.085096	-9.99	-0.004374	0.000024	-0.004318	0.000023	-0.000638	0.000023	0.000023	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:38:40	L	5027.608N	00413.512W	17.918438	20.085592	-9.99	-0.004918	0.000026	-0.004817	0.000026	-0.000638	0.000026	0.000026	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:38:50	L	5027.700N	00413.514W	17.928514	20.08497	-9.99	-0.005094	0.000024	-0.005004	0.000024	-0.000638	0.000024	0.000024	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:39:00	L	5027.715N	00413.516W	17.939885	20.084351	-9.99	-0.005282	0.000024	-0.005206	0.000024	-0.000638	0.000024	0.000024	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:39:10	L	5027.730N	00413.516W	17.939711	20.087954	-9.99	-0.005245	0.000024	-0.005206	0.000024	-0.000638	0.000024	0.000024	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:39:20	L	5027.745N	00413.516W	17.939865	20.087954	-9.99	-0.005173	0.000029	-0.005107	0.000029	-0.000638	0.000029	0.000029	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:39:30	L	5027.760N	00413.516W	17.93063	20.086588	-9.99	-0.005022	0.000016	-0.005463	0.000023	-0.000638	0.000023	0.000023	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:39:40	L	5027.774N	00413.515W	17.933491	20.08609	-9.99	-0.005271	0.000023	-0.005533	0.000024	-0.000638	0.000024	0.000024	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:39:50	L	5027.788N	00413.515W	17.970062	20.088079	-9.99	-0.005844	0.000027	-0.005707	0.000023	-0.000638	0.000023	0.000023	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:40:00	L	5027.803N	00413.514W	17.993696	20.085468	-9.99	-0.005962	0.000021	-0.006001	0.00002	-0.000638	0.000021	0.000021	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:40:10	L	5027.816N	00413.513W	18.01758	20.086462	-9.99	-0.006298	0.000025	-0.00636	0.000029	-0.000638	0.000029	0.000029	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:40:20	L	5027.829N	00413.512W	18.027407	20.087706	-9.99	-0.006396	0.000015	-0.006529	0.000018	-0.000638	0.000018	0.000018	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:40:30	L	5027.843N	00413.509W	18.043081	20.087408	-9.99	-0.007026	0.000027	-0.006718	0.000022	-0.000638	0.000022	0.000022	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:40:40	L	5027.856N	00413.506W	18.03002	20.085642	-9.99	-0.007086	0.000013	-0.007018	0.000021	-0.000638	0.000021	0.000021	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:40:50	L	5027.868N	00413.504W	18.027781	20.089445	-9.99	-0.007086	0.000022	-0.007072	0.000017	-0.000638	0.000017	0.000017	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:41:00	L	5027.881N	00413.501W	18.036603	20.089197	-9.99	-0.007087	0.000022	-0.007072	0.000017	-0.000638	0.000017	0.000017	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:41:10	L	5027.895N	00413.499W	18.025417	20.088451	-9.99	-0.006997	0.000022	-0.007072	0.000017	-0.000638	0.000017	0.000017	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:41:20	L	5027.906N	00413.494W	18.02889	20.088451	-9.99	-0.006978	0.000024	-0.007294	0.000024	-0.000638	0.000024	0.000024	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:41:30	L	5027.917N	00413.488W	18.038229	20.089943	-9.99	-0.007449	0.000029	-0.007487	0.000024	-0.000638	0.000024	0.000024	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:41:40	L	5027.929N	00413.479W	18.043703	20.088079	-9.99	-0.007666	0.000027	-0.007574	0.000021	-0.000638	0.000021	0.000021	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:41:50	L	5027.940N	00413.471W	18.061989	20.089451	-9.99	-0.00777	0.000018	-0.007769	0.000018	-0.000638	0.000018	0.000018	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:42:00	L	5027.950N	00413.453W	18.052784	20.089073	-9.99	-0.007721	0.000024	-0.00773	0.000024	-0.000638	0.000024	0.000024	7.543166	7.540094	13.267628	2.286011	11.03959	-1.506348
25/08/99	12:42:10	L	5027.964N	00413.453W	18.065472	20.091063	-9.99	-0.007813	0.000026	-0.007815	0.000022	-0.000638	0.000022	0.000022	7.54316					

25/08/99	12:42:30 L	5027.987N	00413.433W	18.079527	20.092056	-9.99	-0.00794	0.000024	-0.008051	0.000017	0.000011	0.000017	7.624657	7.621576	13.262352	2.310669	11.2434	-1.506348
25/08/99	12:42:40 L	5028.002N	00413.422W	18.051538	20.090317	-9.99	-0.007771	0.000017	-0.007914	0.000019	0.000143	0.000018	7.62167	7.618584	13.260043	2.304199	11.25014	-1.506311
25/08/99	12:42:50 L	5028.014N	00413.409W	18.052908	20.091558	-9.99	-0.007827	0.00002	-0.007963	0.000019	0.000136	0.000019	7.622852	7.619557	13.26211	2.308472	11.25545	-1.506274
25/08/99	12:43:00 L	5028.023N	00413.397W	18.055271	20.094418	-9.99	-0.007814	0.000025	-0.007998	0.000016	0.000184	0.000021	7.622428	7.619337	13.261866	2.317749	11.26281	-1.506311
25/08/99	12:43:10 L	5028.034N	00413.382W	18.044699	20.091434	-9.99	-0.00773	0.000017	-0.007954	0.000018	0.000224	0.000017	7.620947	7.617858	13.262144	2.308326	11.26909	-1.506311
25/08/99	12:43:20 L	5028.043N	00413.366W	18.040842	20.090813	-9.99	-0.007686	0.000023	-0.007921	0.000022	0.000235	0.000022	7.620181	7.617088	13.262056	2.315308	11.27585	-1.506262
25/08/99	12:43:30 L	5028.049N	00413.349W	18.038603	20.09305	-9.99	-0.007609	0.000024	-0.007848	0.000023	0.000239	0.000024	7.618831	7.61575	13.262215	2.320801	11.28214	-1.506335
25/08/99	12:43:40 L	5028.057N	00413.331W	18.040096	20.094787	-9.99	-0.007635	0.000022	-0.007811	0.000017	0.000188	0.000018	7.619081	7.615986	13.262958	2.324341	11.28851	-1.506282
25/08/99	12:43:50 L	5028.064N	00413.313W	18.065969	20.091187	-9.99	-0.007635	0.000022	-0.007811	0.000017	0.000188	0.000018	7.619081	7.615986	13.262958	2.324341	11.28851	-1.506282
25/08/99	12:44:00 L	5028.073N	00413.277W	18.130357	20.094791	-9.99	-0.007835	0.000024	-0.007811	0.000022	0.000334	0.000022	7.636142	7.633049	13.259746	2.316406	11.29481	-1.506348
25/08/99	12:44:10 L	5028.078N	00413.257W	18.168215	20.093392	-9.99	-0.00853	0.000024	-0.007811	0.000022	0.000334	0.000022	7.636142	7.633049	13.259746	2.316406	11.29481	-1.506348
25/08/99	12:44:20 L	5028.084N	00413.240W	18.210009	20.095039	-9.99	-0.00887	0.000022	-0.007811	0.000022	0.000334	0.000022	7.636142	7.633049	13.259746	2.316406	11.29481	-1.506348
25/08/99	12:44:30 L	5028.089N	00413.221W	18.21312	20.0933	-9.99	-0.009559	0.000021	-0.008631	0.000016	0.000391	0.000016	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:44:40 L	5028.092N	00413.199W	18.237497	20.093287	-9.99	-0.00988	0.000023	-0.008631	0.000016	0.000391	0.000016	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:44:50 L	5028.095N	00413.176W	18.263742	20.094915	-9.99	-0.01006	0.000025	-0.009775	0.000017	0.000285	0.000017	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:45:00 L	5028.098N	00413.156W	18.244463	20.096555	-9.99	-0.00988	0.000023	-0.009775	0.000017	0.000285	0.000017	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:45:10 L	5028.099N	00413.134W	18.25205	20.096283	-9.99	-0.009536	0.000021	-0.009735	0.000016	0.000265	0.000016	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:45:20 L	5028.099N	00413.112W	18.211252	20.097277	-9.99	-0.009786	0.000021	-0.009631	0.000016	0.000265	0.000016	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:45:30 L	5028.099N	00413.093W	18.179917	20.096407	-9.99	-0.010221	0.000024	-0.00953	0.000023	0.000267	0.000024	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:45:40 L	5028.099N	00413.070W	18.179917	20.096407	-9.99	-0.009884	0.000024	-0.00953	0.000023	0.000267	0.000024	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:45:50 L	5028.099N	00413.050W	18.159508	20.096407	-9.99	-0.009884	0.000024	-0.00953	0.000023	0.000267	0.000024	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:46:00 L	5028.099N	00413.033W	18.175056	20.096157	-9.99	-0.010183	0.000023	-0.009688	0.000022	0.000285	0.000022	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:46:10 L	5028.079N	00413.014W	18.196699	20.095287	-9.99	-0.010548	0.000024	-0.009688	0.000022	0.000285	0.000022	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:46:20 L	5028.079N	00412.996W	18.274813	20.097649	-9.99	-0.011278	0.000023	-0.010237	0.000024	0.000311	0.000024	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:46:30 L	5028.067N	00412.978W	18.329416	20.097688	-9.99	-0.011963	0.000021	-0.010763	0.000021	0.000311	0.000021	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:46:40 L	5028.060N	00412.962W	18.332775	20.097688	-9.99	-0.012867	0.000016	-0.011418	0.000016	0.000311	0.000016	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:46:50 L	5028.060N	00412.948W	18.404417	20.095785	-9.99	-0.012008	0.000016	-0.012333	0.000016	0.000311	0.000016	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:47:00 L	5028.049N	00412.934W	18.429541	20.09914	-9.99	-0.013083	0.000021	-0.012627	0.000021	0.000311	0.000021	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:47:10 L	5028.039N	00412.918W	18.452053	20.097325	-9.99	-0.013768	0.000019	-0.012627	0.000019	0.000311	0.000019	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:47:20 L	5028.028N	00412.904W	18.511255	20.097277	-9.99	-0.014079	0.000018	-0.012243	0.000018	0.000311	0.000018	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:47:30 L	5027.985N	00412.878W	18.50061	20.09762	-9.99	-0.014079	0.000018	-0.012243	0.000018	0.000311	0.000018	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:47:40 L	5027.982N	00412.864W	18.48938	20.09762	-9.99	-0.014079	0.000018	-0.012243	0.000018	0.000311	0.000018	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:47:50 L	5027.971N	00412.852W	18.476431	20.095537	-9.99	-0.01419	0.000022	-0.014008	0.000016	0.000311	0.000016	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:48:00 L	5027.958N	00412.840W	18.499689	20.096779	-9.99	-0.014456	0.000018	-0.01445	0.000016	0.000311	0.000016	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:48:10 L	5027.947N	00412.828W	18.497824	20.093424	-9.99	-0.014852	0.000019	-0.01469	0.000016	0.000311	0.000016	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:48:20 L	5027.937N	00412.817W	18.501926	20.095039	-9.99	-0.014852	0.000019	-0.01469	0.000016	0.000311	0.000016	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:48:30 L	5027.925N	00412.806W	18.511503	20.093424	-9.99	-0.014852	0.000019	-0.01469	0.000016	0.000311	0.000016	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:48:40 L	5027.912N	00412.794W	18.477301	20.091808	-9.99	-0.01498	0.000024	-0.01464	0.000014	0.000311	0.000014	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:48:50 L	5027.899N	00412.783W	18.524439	20.092056	-9.99	-0.015247	0.000019	-0.014949	0.000024	0.000298	0.000021	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:49:00 L	5027.886N	00412.772W	18.476431	20.0933	-9.99	-0.015069	0.000023	-0.01505	0.000024	0.000019	0.000023	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:49:10 L	5027.876N	00412.761W	18.439615	20.092428	-9.99	-0.014924	0.000025	-0.014995	0.000022	0.000071	0.000022	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:49:20 L	5027.863N	00412.751W	18.478172	20.093174	-9.99	-0.015177	0.000024	-0.01514	0.000022	0.000071	0.000022	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:49:30 L	5027.852N	00412.742W	18.52423	20.092304	-9.99	-0.015842	0.000025	-0.01514	0.000022	0.000071	0.000022	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:49:40 L	5027.840N	00412.732W	18.58675	20.094418	-9.99	-0.015591	0.00002	-0.015599	0.000024	0.000008	0.000024	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:50:00 L	5027.827N	00412.724W	18.5865	20.091932	-9.99	-0.015751	0.000024	-0.01593	0.000022	0.000179	0.000023	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:50:10 L	5027.817N	00412.715W	18.574189	20.088451	-9.99	-0.015455	0.00002	-0.01584	0.000024	0.000085	0.000022	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335
25/08/99	12:50:20 L	5027.805N	00412.705W	18.555283	20.089943	-9.99	-0.015154	0.000017	-0.015601	0.000025	0.000448	0.000021	7.634367	7.631272	13.258604	2.322754	11.32058	-1.506335

25/08/99	12:58:50	L	5027.100N	00412.355W	18.375985	20.069559	-9.99	-0.019173	0.000022	-0.019981	0.000023	0.000688	0.000022	7.819579	7.819468	13.276377	2.21106	11.86612	-1.506262
25/08/99	12:59:00	L	5027.082N	00412.358W	18.407028	20.070429	-9.99	-0.019336	0.000016	-0.01995	0.000017	0.000613	0.000017	7.822455	7.819338	13.27626	2.202148	11.87221	-1.50625
25/08/99	12:59:10	L	5027.069N	00412.357W	18.453297	20.067694	-9.99	-0.019519	0.00002	-0.020114	0.000024	0.000595	0.000022	7.825638	7.822579	13.280016	2.197754	11.87861	-1.506226
25/08/99	12:59:20	L	5027.052N	00412.361W	18.525682	20.069807	-9.99	-0.019516	0.000027	-0.020147	0.000021	0.000631	0.000024	7.825774	7.827649	13.27852	2.201416	11.89458	-1.506311
25/08/99	12:59:30	L	5027.035N	00412.365W	18.561005	20.069377	-9.99	-0.019637	0.000021	-0.020242	0.000016	0.000605	0.000018	7.827917	7.824799	13.280846	2.197876	11.89054	-1.506213
25/08/99	12:59:40	L	5027.021N	00412.365W	18.537498	20.065558	-9.99	-0.019932	0.000021	-0.020379	0.00002	0.000447	0.000021	7.832398	7.829857	13.280808	2.187256	11.89659	-1.506189
25/08/99	12:59:50	L	5027.005N	00412.367W	18.544338	20.067198	-9.99	-0.020239	0.000025	-0.02062	0.000022	0.000382	0.000024	7.839322	7.835172	13.280506	2.188599	11.90297	-1.506335
25/08/99	13:00:00	L	5026.990N	00412.367W	18.487003	20.064215	-9.99	-0.020264	0.000015	-0.020823	0.000017	0.000559	0.000016	7.838628	7.83551	13.281197	2.180054	11.90833	-1.506262
25/08/99	13:00:10	L	5026.978N	00412.368W	18.445461	20.062723	-9.99	-0.020507	0.000015	-0.021075	0.000013	0.000568	0.000016	7.842782	7.839642	13.283321	2.173482	11.91482	-1.506226
25/08/99	13:00:20	L	5026.963N	00412.371W	18.409367	20.059118	-9.99	-0.021068	0.000024	-0.021618	0.000018	0.00055	0.000021	7.845137	7.842017	13.28229	2.170288	11.92079	-1.506128
25/08/99	13:00:30	L	5026.934N	00412.373W	18.439367	20.059118	-9.99	-0.021068	0.000024	-0.021618	0.000018	0.00055	0.000021	7.845447	7.842928	13.283671	2.162598	11.92712	-1.506262
25/08/99	13:00:40	L	5026.908N	00412.375W	18.462128	20.059368	-9.99	-0.021042	0.000019	-0.021707	0.000021	0.000666	0.000022	7.852026	7.848915	13.284281	2.157837	11.933	-1.506201
25/08/99	13:00:50	L	5026.919N	00412.376W	18.483768	20.059988	-9.99	-0.021294	0.000019	-0.021928	0.000024	0.000634	0.000021	7.855421	7.852304	13.283313	2.160889	11.93885	-1.506213
25/08/99	13:01:00	L	5026.903N	00412.376W	18.493595	20.05885	-9.99	-0.021435	0.000024	-0.022069	0.000022	0.000633	0.000023	7.858883	7.855757	13.284133	2.145996	11.94474	-1.506311
25/08/99	13:01:10	L	5026.888N	00412.377W	18.516356	20.058496	-9.99	-0.021471	0.000024	-0.022205	0.000018	0.000735	0.000021	7.859532	7.856413	13.285369	2.157104	11.95104	-1.506152
25/08/99	13:01:20	L	5026.871N	00412.378W	18.506281	20.058496	-9.99	-0.021471	0.000024	-0.022205	0.000016	0.000905	0.000018	7.856636	7.853513	13.286189	2.151611	11.95683	-1.506213
25/08/99	13:01:30	L	5026.853N	00412.374W	18.444342	20.056507	-9.99	-0.021024	0.000024	-0.021985	0.000016	0.000941	0.000022	7.85497	7.851856	13.283153	2.136108	11.96266	-1.506165
25/08/99	13:01:40	L	5026.838N	00412.368W	18.409143	20.055282	-9.99	-0.020669	0.000021	-0.021697	0.000023	0.001028	0.000022	7.853579	7.850475	13.282098	2.130737	11.96853	-1.50625
25/08/99	13:01:50	L	5026.820N	00412.361W	18.340611	20.055389	-9.99	-0.020565	0.00002	-0.02152	0.000012	0.000955	0.000016	7.843579	7.840475	13.284613	2.140625	11.97478	-1.50614
25/08/99	13:02:00	L	5026.802N	00412.358W	18.2773	20.055885	-9.99	-0.020616	0.000022	-0.021442	0.000024	0.000825	0.000023	7.844365	7.841254	13.278195	2.14209	11.99059	-1.506128
25/08/99	13:02:10	L	5026.768N	00412.346W	18.306554	20.056881	-9.99	-0.020943	0.000021	-0.021634	0.000024	0.000691	0.000022	7.850068	7.846956	13.284771	2.134768	11.99638	-1.506128
25/08/99	13:02:20	L	5026.750N	00412.339W	18.325064	20.055885	-9.99	-0.021269	0.000024	-0.021897	0.000021	0.000629	0.000022	7.855725	7.852622	13.283828	2.142456	11.99225	-1.506152
25/08/99	13:02:30	L	5026.739N	00412.331W	18.314365	20.054768	-9.99	-0.02125	0.000023	-0.022021	0.000022	0.000771	0.000022	7.855385	7.852277	13.281255	2.134033	11.99851	-1.506238
25/08/99	13:02:40	L	5026.715N	00412.329W	18.239042	20.054892	-9.99	-0.021491	0.000015	-0.022168	0.000021	0.000676	0.000018	7.852771	7.849677	13.284417	2.145264	12.00431	-1.506226
25/08/99	13:02:50	L	5026.698N	00412.317W	18.323899	20.057005	-9.99	-0.021951	0.000024	-0.02273	0.000018	0.000782	0.000022	7.863158	7.860064	13.283908	2.140747	12.01014	-1.506189
25/08/99	13:03:00	L	5026.684N	00412.294W	18.414616	20.061135	-9.99	-0.02184	0.000024	-0.02273	0.000024	0.000822	0.000022	7.867939	7.864836	13.285418	2.143066	12.01601	-1.506311
25/08/99	13:03:10	L	5026.672N	00412.277W	18.352427	20.056337	-9.99	-0.02196	0.000016	-0.022749	0.000016	0.000809	0.000016	7.867729	7.864612	13.283629	2.137329	12.02806	-1.506114
25/08/99	13:03:20	L	5026.657N	00412.259W	18.308521	20.055513	-9.99	-0.021977	0.00002	-0.02275	0.000015	0.000786	0.000018	7.867939	7.864836	13.282593	2.137329	12.03978	-1.506079
25/08/99	13:03:30	L	5026.644N	00412.240W	18.310137	20.056135	-9.99	-0.022063	0.000021	-0.022929	0.000023	0.000836	0.000023	7.867597	7.864483	13.282833	2.142944	12.046	-1.506152
25/08/99	13:03:40	L	5026.633N	00412.224W	18.326307	20.058249	-9.99	-0.022135	0.000019	-0.023002	0.000023	0.000867	0.000023	7.869948	7.866847	13.284636	2.140381	12.0583	-1.506287
25/08/99	13:03:50	L	5026.619N	00412.208W	18.337502	20.058496	-9.99	-0.02227	0.00002	-0.023118	0.000026	0.000848	0.000023	7.87306	7.869949	13.284636	2.140381	12.0583	-1.506287
25/08/99	13:04:00	L	5026.604N	00412.197W	18.368343	20.057875	-9.99	-0.022433	0.000021	-0.023234	0.000014	0.000801	0.000018	7.875824	7.872815	13.282916	2.146118	12.05765	-1.506348
25/08/99	13:04:10	L	5026.591N	00412.183W	18.377676	20.060882	-9.99	-0.022563	0.000024	-0.023359	0.000025	0.000796	0.000025	7.878181	7.875075	13.284442	2.152344	12.06355	-1.50625
25/08/99	13:04:20	L	5026.579N	00412.169W	18.41362	20.056383	-9.99	-0.022491	0.000022	-0.023378	0.000018	0.000887	0.00002	7.876897	7.873884	13.280354	2.145752	12.06983	-1.506152
25/08/99	13:04:30	L	5026.567N	00412.154W	18.414368	20.058173	-9.99	-0.022484	0.000018	-0.023299	0.000022	0.000815	0.00002	7.876897	7.873884	13.281667	2.147827	12.07564	-1.506335
25/08/99	13:04:40	L	5026.555N	00412.141W	18.28153	20.059366	-9.99	-0.022399	0.000025	-0.02323	0.000018	0.000831	0.000021	7.875198	7.872094	13.281809	2.15686	12.08147	-1.506213
25/08/99	13:04:50	L	5026.542N	00412.128W	18.237373	20.057503	-9.99	-0.022482	0.000017	-0.023346	0.000021	0.000865	0.000019	7.875198	7.872094	13.281809	2.15686	12.08147	-1.506213
25/08/99	13:05:00	L	5026.528N	00412.115W	18.202049	20.060112	-9.99	-0.022375	0.000019	-0.023378	0.000018	0.000831	0.000021	7.875198	7.872094	13.281809	2.15686	12.08147	-1.506213
25/08/99	13:05:10	L	5026.515N	00412.103W	18.137865	20.062349	-9.99	-0.022228	0.000019	-0.02327	0.000024	0.000933	0.000022	7.875198	7.872094	13.281809	2.15686	12.08147	-1.506213
25/08/99	13:05:20	L	5026.503N	00412.090W	18.112864	20.061232	-9.99	-0.0222	0.000024	-0.02327	0.000018	0.000933	0.000022	7.875198	7.872094	13.281809	2.15686	12.08147	-1.506213
25/08/99	13:05:30	L	5026.489N	00412.078W	18.091967	20.05974	-9.99	-0.022305	0.000024	-0.023346	0.000022	0.000944	0.000023	7.875198	7.872094	13.281809	2.15686	12.08147	-1.506213
25/08/99	13:05:40	L	5026.476N	00412.067W	18.075738	20.06061	-9.99	-0.022434	0.000024	-0.023346	0.000022	0.000944	0.000023	7.875198	7.872094	13.281809	2.15686	12.08147	-1.506213
25/08/99	13:05:50	L	5026.463N	00412.053W	18.09831	20.063717	-9.99	-0.022446	0.000026	-0.023485	0.000015	0.001039	0.000023	7.875198	7.872094	13.281809	2.15686	12.08147	-1.506213
25/08/99	13:06:00	L	5026.448N	00412.041W	18.103037	20.063593	-9.99	-0.02256	0.000023	-0.023566	0.000022	0.001007	0.000023	7.875198	7.872094	13.281809	2.15686	12.08147	-1.506213
25/08/99	13:06:10	L	5026.434N	00412.027W	18.092091	20.061232	-9.99	-0.022623	0.000024	-0.023615	0.000023	0.000992	0.000024	7.875198	7.872094	13.281809	2.15686	12.08147	-1.506213
25/08/99	13:06:20	L	5026.419N	00412.016W	18.07538	20.064215	-9.99	-0.022653	0.000025	-0.023642	0.000023	0.000989	0.000024	7.875198	7.872094	13.281809	2.15686	12.08147	-1.506213
25/08/99	13:06:30	L	5026.403N	00412.002W	18.04619	20.064215	-9.99	-0.022745	0.000028	-0.023723	0.00002	0.000979	0.000024	7.875198	7.872094	13.281809	2.15686	12.08147	-1.506213
25/08/99	13:06:40	L	5026.389N	00411.989W	18.041214	20.0667	-9.99	-0.022702	0.000024	-0.023777	0.000011	0.001075	0.000017	7.875198	7.872094	13.281809	2.15686	12.08147	-1.5062

25/08/99	13:07:00	L	5026.373N	00411.975W	18.04134	20.063343	-9.99	-0.022766	0.000018	-0.023897	0.000024	0.001131	0.000021	7.881165	7.879083	13.277577	2.178833	12.15963	-1.50625
25/08/99	13:07:10	L	5026.356N	00411.965W	18.062611	20.06406	-9.99	-0.022807	0.000025	-0.023923	0.000018	0.001117	0.000022	7.881905	7.879824	13.276751	2.176636	12.16599	-1.506238
25/08/99	13:07:20	L	5026.338N	00411.954W	18.054276	20.06558	-9.99	-0.02285	0.000024	-0.024001	0.000024	0.001151	0.000024	7.88264	7.879556	13.27923	2.178345	12.17189	-1.506201
25/08/99	13:07:30	L	5026.324N	00411.941W	18.029148	20.064711	-9.99	-0.022837	0.000024	-0.024029	0.000016	0.0012	0.000018	7.882242	7.879155	13.275887	2.165649	12.17786	-1.50603
25/08/99	13:07:40	L	5026.308N	00411.927W	18.054399	20.064452	-9.99	-0.022807	0.000025	-0.024017	0.000019	0.001211	0.000022	7.881892	7.879812	13.275945	2.18042	12.18382	-1.506081
25/08/99	13:07:50	L	5026.292N	00411.915W	18.161747	20.065863	-9.99	-0.022769	0.000016	-0.023997	0.000024	0.001229	0.000022	7.881404	7.879314	13.277987	2.187744	12.19014	-1.506238
25/08/99	13:08:00	L	5026.278N	00411.908W	17.953768	20.069061	-9.99	-0.023335	0.000023	-0.023826	0.000018	0.000991	0.00002	7.884145	7.881049	13.277963	2.178223	12.19607	-1.506311
25/08/99	13:08:10	L	5026.263N	00411.895W	17.919062	20.067446	-9.99	-0.023391	0.000024	-0.024559	0.000022	0.001118	0.000022	7.881783	7.887703	13.27876	2.19873	12.20201	-1.50625
25/08/99	13:08:20	L	5026.232N	00411.885W	17.932993	20.063965	-9.99	-0.023358	0.000024	-0.024559	0.000022	0.001118	0.000022	7.881783	7.887703	13.27876	2.19873	12.20201	-1.50625
25/08/99	13:08:30	L	5026.216N	00411.880W	17.953768	20.067818	-9.99	-0.023358	0.000024	-0.024559	0.000022	0.001118	0.000022	7.881783	7.887703	13.27876	2.19873	12.20201	-1.50625
25/08/99	13:08:40	L	5026.199N	00411.880W	18.038727	20.067446	-9.99	-0.023353	0.000026	-0.024809	0.000015	0.001226	0.000031	7.882714	7.889638	13.275874	2.181396	12.21447	-1.506348
25/08/99	13:09:00	L	5026.184N	00411.882W	18.242224	20.069559	-9.99	-0.023729	0.000025	-0.024959	0.000013	0.001284	0.000019	7.891455	7.895038	13.273911	2.195435	12.2204	-1.506226
25/08/99	13:09:10	L	5026.170N	00411.886W	18.263742	20.069309	-9.99	-0.023355	0.000018	-0.024819	0.000013	0.001284	0.000019	7.891455	7.895038	13.273911	2.195435	12.2204	-1.506226
25/08/99	13:09:20	L	5026.155N	00411.893W	18.239737	20.069061	-9.99	-0.023355	0.000018	-0.024819	0.000013	0.001284	0.000019	7.891455	7.895038	13.273911	2.195435	12.2204	-1.506226
25/08/99	13:09:30	L	5026.142N	00411.902W	18.436754	20.067072	-9.99	-0.02396	0.000021	-0.02501	0.000018	0.00105	0.000019	7.902129	7.89903	13.274699	2.190186	12.24478	-1.506177
25/08/99	13:09:40	L	5026.127N	00411.913W	18.562	20.067944	-9.99	-0.024633	0.000024	-0.025398	0	0.001023	0.000013	7.909603	7.906482	13.27809	2.176392	12.25069	-1.506079
25/08/99	13:09:50	L	5026.113N	00411.925W	18.675922	20.064587	-9.99	-0.024563	0.000024	-0.025672	0.000024	0.001008	0.000022	7.914763	7.911632	13.279502	2.17981	12.25668	-1.506262
25/08/99	13:10:00	L	5026.100N	00411.937W	18.652914	20.065084	-9.99	-0.02504	0.000024	-0.026272	0.000022	0.000958	0.000022	7.921516	7.918985	13.281208	2.182354	12.26303	-1.506104
25/08/99	13:10:10	L	5026.085N	00411.950W	18.574312	20.061232	-9.99	-0.025268	0.000028	-0.026425	0.000021	0.001157	0.000024	7.925227	7.922101	13.281218	2.185859	12.2748	-1.506189
25/08/99	13:10:20	L	5026.070N	00411.960W	18.630901	20.058496	-9.99	-0.025392	0.000024	-0.026599	0.000024	0.001207	0.000024	7.927455	7.924318	13.280866	2.188794	12.28072	-1.506177
25/08/99	13:10:30	L	5026.056N	00411.968W	18.676792	20.057503	-9.99	-0.025679	0.000024	-0.026798	0.000024	0.001207	0.000024	7.927455	7.924318	13.280866	2.188794	12.28072	-1.506177
25/08/99	13:10:40	L	5026.040N	00411.979W	18.662117	20.057751	-9.99	-0.02582	0.000005	-0.027025	0.000019	0.001206	0.000022	7.934877	7.931385	13.283876	2.183576	12.29281	-1.506165
25/08/99	13:10:50	L	5026.024N	00411.990W	18.527424	20.057377	-9.99	-0.025809	0.00002	-0.027101	0.000023	0.001292	0.000022	7.934877	7.931385	13.283876	2.183576	12.29281	-1.506165
25/08/99	13:11:00	L	5026.008N	00412.001W	18.640728	20.055389	-9.99	-0.025915	0.000026	-0.027331	0.000024	0.001425	0.000025	7.936487	7.933364	13.286243	2.184023	12.30447	-1.506201
25/08/99	13:11:10	L	5025.995N	00412.009W	18.696568	20.054644	-9.99	-0.025961	0.000019	-0.027331	0.000023	0.00137	0.000021	7.93737	7.934231	13.287876	2.186221	12.3107	-1.506128
25/08/99	13:11:20	L	5025.979N	00412.019W	18.665102	20.052406	-9.99	-0.025973	0.000019	-0.027367	0.000013	0.001395	0.000016	7.93732	7.934398	13.288061	2.115967	12.31646	-1.506177
25/08/99	13:11:30	L	5025.962N	00412.029W	18.625429	20.051908	-9.99	-0.025924	0.000021	-0.027364	0.000012	0.001441	0.000017	7.936627	7.93355	13.29054	2.105835	12.32219	-1.506055
25/08/99	13:11:40	L	5025.947N	00412.037W	18.597942	20.049547	-9.99	-0.02597	0.000017	-0.02741	0.000015	0.00144	0.000016	7.937387	7.934259	13.292988	2.097168	12.33414	-1.506177
25/08/99	13:11:50	L	5025.931N	00412.043W	18.581028	20.048553	-9.99	-0.025877	0.00002	-0.027375	0.000021	0.001499	0.00002	7.935778	7.932656	13.292988	2.116455	12.32844	-1.506165
25/08/99	13:12:00	L	5025.914N	00412.043W	18.581028	20.048553	-9.99	-0.025877	0.00002	-0.027375	0.000021	0.001499	0.00002	7.935778	7.932656	13.292988	2.116455	12.32844	-1.506165
25/08/99	13:12:10	L	5025.900N	00412.049W	18.514986	20.04731	-9.99	-0.025772	0.000008	-0.027286	0.000024	0.001469	0.000016	7.934732	7.931611	13.291244	2.096313	12.33983	-1.506201
25/08/99	13:12:20	L	5025.884N	00412.056W	18.398323	20.046316	-9.99	-0.025812	0.000017	-0.027226	0.000022	0.001454	0.00002	7.933859	7.93073	13.290631	2.088867	12.34555	-1.506177
25/08/99	13:12:30	L	5025.867N	00412.061W	18.32556	20.044825	-9.99	-0.02583	0.000017	-0.027185	0.000025	0.001373	0.000021	7.934592	7.931484	13.290692	2.088135	12.35169	-1.506201
25/08/99	13:12:40	L	5025.852N	00412.068W	18.25205	20.044825	-9.99	-0.02583	0.000025	-0.027386	0.000024	0.00149	0.000025	7.935629	7.93253	13.290754	2.086792	12.36304	-1.506238
25/08/99	13:12:50	L	5025.835N	00412.074W	18.238991	20.045894	-9.99	-0.025848	0.000028	-0.027387	0.000024	0.001539	0.000026	7.935629	7.93253	13.290754	2.086792	12.36304	-1.506238
25/08/99	13:13:00	L	5025.818N	00412.079W	18.18961	20.047079	-9.99	-0.025932	0.000024	-0.027497	0.000026	0.001545	0.000025	7.935629	7.93253	13.290754	2.086792	12.36304	-1.506238
25/08/99	13:13:10	L	5025.803N	00412.083W	18.157892	20.049353	-9.99	-0.026298	0.000024	-0.027497	0.000026	0.001545	0.000025	7.935629	7.93253	13.290754	2.086792	12.36304	-1.506238
25/08/99	13:13:20	L	5025.787N	00412.088W	18.165106	20.042337	-9.99	-0.026543	0.000024	-0.027497	0.000026	0.001545	0.000025	7.935629	7.93253	13.290754	2.086792	12.36304	-1.506238
25/08/99	13:13:30	L	5025.773N	00412.097W	18.17033	20.043581	-9.99	-0.02667	0.000023	-0.027912	0.000011	0.001359	0.000017	7.942457	7.939362	13.291899	2.072632	12.37487	-1.505994
25/08/99	13:13:40	L	5025.761N	00412.107W	18.17033	20.043581	-9.99	-0.02667	0.000023	-0.027912	0.000011	0.001359	0.000017	7.942457	7.939362	13.291899	2.072632	12.37487	-1.505994
25/08/99	13:13:50	L	5025.746N	00412.114W	18.207148	20.039602	-9.99	-0.026637	0.000026	-0.028208	0.000019	0.001571	0.000022	7.946804	7.943513	13.295341	2.06804	12.39171	-1.506042
25/08/99	13:14:00	L	5025.732N	00412.120W	18.144583	20.040722	-9.99	-0.026551	0.000017	-0.028186	0.000019	0.001624	0.00002	7.94744	7.944342	13.288741	2.061768	12.40341	-1.505969
25/08/99	13:14:10	L	5025.719N	00412.126W	18.089603	20.039728	-9.99	-0.026532	0.000024	-0.028163	0.000022	0.001635	0.000019	7.943722	7.940609	13.291451	2.057617	12.40903	-1.506018
25/08/99	13:14:20	L	5025.704N	00412.133W	18.028402	20.038733	-9.99	-0.026694	0.000023	-0.028252	0.000018	0.001559	0.000023	7.946423	7.943323	13.291217	2.065552	12.41463	-1.506189
25/08/99	13:14:30	L	5025.689N	00412.141W	18.092091	20.037241	-9.99	-0.026652	0.000016	-0.028306	0.000018	0.001559	0.000023	7.946423	7.943323	13.291217	2.065552	12.41463	-1.506189
25/08/99	13:14:40	L	5025.673N	00412.149W	18.130526	20.037739	-9.99	-0.026737	0.000024	-0.028365	0.00002	0.001653	0.000018	7.946502	7.943403	13.290792	2.045776	12.42629	-1.505957
25/08/99	13:14:50	L	5025.660N	00412.156W	18.178789	20.03488	-9.99	-0.026834	0.000025	-0.028444	0.000014	0.001611	0.00002	7.950025	7.946922	13.289713	2.049683	12.43186	-1.506067
25/08/99	13:15:00	L	5025.644N	00412.163W	18.185133	20.036247	-9.99	-0.026852	0.000019	-0.028457	0.000021	0.001605	0.00002	7.952078	7.94898	13.291429	2.036821		

25/08/99	13:15:10	L	5025.627N	00412.169W	18.178291	20.036745	-9.99	-0.028959	0.000022	-0.028571	0.000024	0.001612	0.000023	7.953915	7.950822	13.293066	2.037109	12.449	-1.506079
25/08/99	13:15:20	L	5025.614N	00412.174W	18.163116	20.035625	-9.99	-0.027057	0.000019	-0.028654	0.000022	0.001597	0.00002	7.955596	7.952499	13.294307	2.032227	12.4542	-1.50614
25/08/99	13:15:30	L	5025.597N	00412.181W	18.149557	20.032021	-9.99	-0.027149	0.000017	-0.028756	0.000024	0.001607	0.00002	7.957177	7.954074	13.29235	2.026733	12.4606	-1.506177
25/08/99	13:15:40	L	5025.580N	00412.187W	18.139482	20.033388	-9.99	-0.027159	0.000021	-0.028817	0.000024	0.001659	0.00002	7.957326	7.954235	13.297698	2.027832	12.46604	-1.505933
25/08/99	13:15:50	L	5025.565N	00412.191W	18.066341	20.026304	-9.99	-0.027346	0.000017	-0.028892	0.000015	0.001546	0.000016	7.960464	7.957381	13.29811	2.025269	12.47152	-1.505992
25/08/99	13:16:00	L	5025.546N	00412.194W	18.013849	20.029813	-9.99	-0.027422	0.000025	-0.029042	0.000018	0.001621	0.000022	7.961714	7.958632	13.29331	2.015991	12.47699	-1.505984
25/08/99	13:16:10	L	5025.528N	00412.196W	18.075567	20.028197	-9.99	-0.027341	0.000017	-0.029042	0.000018	0.001702	0.000018	7.96039	7.957306	13.297926	2.014648	12.48249	-1.505981
25/08/99	13:16:20	L	5025.513N	00412.198W	18.118586	20.029783	-9.99	-0.027344	0.00002	-0.029074	0.000022	0.001715	0.000021	7.960505	7.957441	13.298218	2.021606	12.48845	-1.505981
25/08/99	13:16:30	L	5025.495N	00412.200W	18.150179	20.02879	-9.99	-0.027367	0.000024	-0.029082	0.000016	0.001756	0.000021	7.960946	7.957846	13.297887	2.010378	12.49391	-1.506018
25/08/99	13:16:40	L	5025.478N	00412.200W	18.195829	20.028666	-9.99	-0.027376	0.000024	-0.029132	0.000017	0.001729	0.000021	7.960782	7.957655	13.298728	2.007324	12.50483	-1.506079
25/08/99	13:16:50	L	5025.463N	00412.200W	18.191725	20.029535	-9.99	-0.027353	0.000021	-0.029082	0.000017	0.001739	0.000021	7.960508	7.9581918	13.294657	2.002563	12.50938	-1.506042
25/08/99	13:17:00	L	5025.446N	00412.200W	18.149807	20.030903	-9.99	-0.027429	0.000023	-0.029118	0.000022	0.001688	0.000022	7.960208	7.958623	13.297213	2.011597	12.51081	-1.505994
25/08/99	13:17:10	L	5025.429N	00412.199W	18.154781	20.030281	-9.99	-0.027356	0.000023	-0.029118	0.000022	0.001739	0.000022	7.960765	7.957662	13.299414	2.007812	12.51628	-1.505969
25/08/99	13:17:20	L	5025.415N	00412.198W	18.151672	20.030903	-9.99	-0.027393	0.00002	-0.029132	0.00001	0.001739	0.000015	7.961399	7.958298	13.296485	2.011963	12.52174	-1.505981
25/08/99	13:17:30	L	5025.398N	00412.198W	18.119579	20.031897	-9.99	-0.027324	0.000024	-0.029016	0.000024	0.001691	0.000024	7.960166	7.958058	13.297906	2.012817	12.52718	-1.505981
25/08/99	13:17:40	L	5025.382N	00412.195W	18.150801	20.028168	-9.99	-0.0272	0.000018	-0.028997	0.000021	0.001798	0.000019	7.959046	7.954958	13.295368	2.007732	12.53311	-1.506055
25/08/99	13:17:50	L	5025.369N	00412.194W	18.252672	20.028913	-9.99	-0.027233	0.000021	-0.029077	0.000019	0.001744	0.00002	7.960492	7.957383	13.295823	2.004639	12.53856	-1.506116
25/08/99	13:18:00	L	5025.352N	00412.193W	18.342104	20.029161	-9.99	-0.027261	0.000024	-0.029036	0.000019	0.001775	0.000021	7.959357	7.956247	13.297769	2.00415	12.54403	-1.505945
25/08/99	13:18:10	L	5025.338N	00412.194W	18.350685	20.029783	-9.99	-0.027199	0.000019	-0.028966	0.000024	0.001767	0.000021	7.958298	7.955186	13.296362	2.007202	12.54948	-1.506086
25/08/99	13:18:20	L	5025.323N	00412.196W	18.355412	20.031399	-9.99	-0.027143	0.000019	-0.028904	0.000023	0.001761	0.000021	7.957335	7.954223	13.298711	2.005859	12.55541	-1.506287
25/08/99	13:18:30	L	5025.307N	00412.199W	18.379048	20.031399	-9.99	-0.027143	0.000019	-0.028904	0.000023	0.001761	0.000021	7.957335	7.954223	13.298711	2.005859	12.55541	-1.506287
25/08/99	13:18:40	L	5025.292N	00412.203W	18.379789	20.029411	-9.99	-0.026925	0.000024	-0.028687	0.000019	0.001738	0.000021	7.955418	7.952298	13.298812	2.008423	12.56086	-1.505981
25/08/99	13:18:50	L	5025.278N	00412.207W	18.340611	20.029161	-9.99	-0.026941	0.000019	-0.028685	0.00002	0.001744	0.000019	7.95378	7.950673	13.299014	1.995117	12.57764	-1.505945
25/08/99	13:19:00	L	5025.262N	00412.213W	18.308395	20.029335	-9.99	-0.026941	0.000019	-0.028685	0.00002	0.001744	0.000019	7.95378	7.950673	13.299014	1.995117	12.57764	-1.505945
25/08/99	13:19:10	L	5025.246N	00412.220W	18.298695	20.02879	-9.99	-0.026911	0.000021	-0.028685	0.000024	0.001743	0.000021	7.95324	7.950142	13.300474	1.997192	12.58306	-1.505957
25/08/99	13:19:20	L	5025.230N	00412.230W	18.26623	20.02879	-9.99	-0.027019	0.000024	-0.028714	0.000024	0.001685	0.000024	7.955068	7.951969	13.299719	1.992554	12.58848	-1.506006
25/08/99	13:19:30	L	5025.217N	00412.240W	18.26223	20.027422	-9.99	-0.02705	0.000021	-0.028783	0.000019	0.001733	0.00002	7.955338	7.952436	13.301009	1.985474	12.5943	-1.506165
25/08/99	13:19:40	L	5025.201N	00412.249W	18.217224	20.027796	-9.99	-0.02695	0.000021	-0.028783	0.000019	0.001733	0.00002	7.955338	7.952436	13.301009	1.985474	12.5943	-1.506165
25/08/99	13:19:50	L	5025.185N	00412.254W	18.21735	20.025682	-9.99	-0.027144	0.000027	-0.028792	0.000025	0.001649	0.000026	7.95716	7.954068	13.302627	1.988647	12.60518	-1.506262
25/08/99	13:20:00	L	5025.169N	00412.260W	18.241976	20.02705	-9.99	-0.026615	0.00002	-0.028633	0.000022	0.001643	0.000024	7.94952	7.946426	13.302115	1.993286	12.61066	-1.506067
25/08/99	13:20:10	L	5025.152N	00412.267W	18.19669	20.024315	-9.99	-0.026931	0.000024	-0.028633	0.000022	0.001643	0.000024	7.94952	7.946426	13.302115	1.993286	12.61066	-1.506067
25/08/99	13:20:20	L	5025.133N	00412.275W	18.209511	20.028542	-9.99	-0.027343	0.000016	-0.028876	0.00002	0.001534	0.000018	7.960598	7.957503	13.300446	1.980347	12.61607	-1.506128
25/08/99	13:20:30	L	5025.115N	00412.279W	18.214611	20.024813	-9.99	-0.02757	0.000024	-0.029095	0.000021	0.001538	0.000023	7.96332	7.961211	13.303175	1.978027	12.62729	-1.506262
25/08/99	13:20:40	L	5025.096N	00412.281W	18.194088	20.02767	-9.99	-0.028014	0.000025	-0.029469	0.000018	0.001456	0.000021	7.972186	7.969092	13.30217	1.9823	12.63266	-1.506201
25/08/99	13:20:50	L	5025.078N	00412.287W	18.170206	20.023195	-9.99	-0.028372	0.000017	-0.029854	0.000024	0.001481	0.000021	7.978355	7.975237	13.302599	1.974243	12.63848	-1.506274
25/08/99	13:21:00	L	5025.058N	00412.289W	18.14222	20.026304	-9.99	-0.028591	0.000024	-0.030206	0.000018	0.001615	0.000021	7.982115	7.979013	13.302249	1.978149	12.64387	-1.506055
25/08/99	13:21:10	L	5025.038N	00412.293W	18.136745	20.025061	-9.99	-0.028663	0.000024	-0.030353	0.00002	0.001689	0.000022	7.98335	7.980253	13.302962	1.977295	12.64923	-1.506067
25/08/99	13:21:20	L	5025.018N	00412.296W	18.167469	20.024813	-9.99	-0.028564	0.000023	-0.030269	0.000017	0.001705	0.000022	7.98335	7.980253	13.302962	1.977295	12.64923	-1.506067
25/08/99	13:21:30	L	5024.998N	00412.295W	18.165728	20.025309	-9.99	-0.028741	0.000025	-0.030374	0.000022	0.001633	0.000024	7.984489	7.981678	13.301811	1.978149	12.65461	-1.506238
25/08/99	13:21:40	L	5024.980N	00412.291W	18.1737	20.026428	-9.99	-0.028904	0.000022	-0.030521	0.000021	0.001617	0.000022	7.984489	7.981678	13.301811	1.978149	12.65461	-1.506238
25/08/99	13:21:50	L	5024.960N	00412.288W	18.215855	20.026428	-9.99	-0.029031	0.000025	-0.030656	0.000014	0.001626	0.000019	7.984489	7.981678	13.301811	1.978149	12.65461	-1.506238
25/08/99	13:22:00	L	5024.940N	00412.286W	18.277125	20.02705	-9.99	-0.029197	0.000025	-0.030841	0.000014	0.001626	0.000019	7.984489	7.981678	13.301811	1.978149	12.65461	-1.506238
25/08/99	13:22:10	L	5024.923N	00412.283W	18.231777	20.025558	-9.99	-0.029398	0.000022	-0.031066	0.000014	0.001626	0.000019	7.984489	7.981678	13.301811	1.978149	12.65461	-1.506238
25/08/99	13:22:20	L	5024.903N	00412.279W	18.223692	20.025185	-9.99	-0.02951	0.000022	-0.031171	0.000014	0.001626	0.000019	7.984489	7.981678	13.301811	1.978149	12.65461	-1.506238
25/08/99	13:22:30	L	5024.884N	00412.273W	18.184013	20.025682	-9.99	-0.029559	0.000014	-0.031249	0.000014	0.001626	0.000019	7.984489	7.981678	13.301811	1.978149	12.65461	-1.506238
25/08/99	13:22:40	L	5024.867N	00412.270W	18.16411	20.027546	-9.99	-0.029595	0.000023	-0.031319	0.000024	0.001724	0.000024	7.984489	7.981678	13.301811	1.978149	12.65461	-1.506238
25/08/99	13:22:50	L	5024.847N	00412.264W	18.153788	20.024813	-9.99	-0.029667	0.000021	-0.031355	0.000021	0.001688	0.000021	7.984489	7.981678	13.301811	1.978149	12.65461	-1.506238
25/08/99	13:23:00	L	5024.831N	00412.258W	18.17145	20.024687	-9.99	-0.029655	0.000014	-0.031396	0.000021	0.001742	0.000021	7.984489	7.981678	13.301811	1.978149	12.65461	

25/08/99	13:23:20	L	5024.796N	00412.252W	17.989468	20.025185	-9.99	-0.029641	0.000024	-0.031366	0.000024	0.001725	0.000024	8.000037	7.997014	13.298612	1.982056	12.72082	-1.506042
25/08/99	13:23:30	L	5024.782N	00412.255W	17.982128	20.026178	-9.99	-0.029559	0.000024	-0.031396	0.000016	0.001797	0.000016	7.999366	7.996279	13.298906	1.982422	12.72631	-1.50603
25/08/99	13:23:40	L	5024.771N	00412.258W	17.969444	20.02688	-9.99	-0.0296	0.000021	-0.031397	0.000018	0.001797	0.000018	7.99936	7.996283	13.297923	1.986084	12.7317	-1.506116
25/08/99	13:23:50	L	5024.757N	00412.258W	17.969344	20.029037	-9.99	-0.029624	0.000025	-0.03142	0.000024	0.001797	0.000024	7.9998	7.99672	13.299526	1.985718	12.7371	-1.506116
25/08/99	13:24:00	L	5024.743N	00412.257W	17.995564	20.028913	-9.99	-0.029595	0.000022	-0.031405	0.000021	0.00181	0.000022	7.999305	7.996224	13.296162	1.983276	12.74301	-1.506116
25/08/99	13:24:10	L	5024.729N	00412.257W	17.997429	20.026552	-9.99	-0.029563	0.00002	-0.03137	0.000024	0.001807	0.000022	7.998754	7.995652	13.296971	1.986084	12.74841	-1.506006
25/08/99	13:24:20	L	5024.717N	00412.259W	18.003027	20.02705	-9.99	-0.029573	0.000024	-0.031381	0.000025	0.001808	0.000025	7.99883	7.995852	13.295754	1.986206	12.75387	-1.505869
25/08/99	13:24:30	L	5024.703N	00412.252W	18.013598	20.027422	-9.99	-0.029583	0.000026	-0.031409	0.000023	0.001826	0.000023	7.99913	7.996366	13.298387	1.988647	12.75925	-1.505933
25/08/99	13:24:40	L	5024.685N	00412.243W	17.996433	20.028168	-9.99	-0.02957	0.000022	-0.031388	0.000023	0.001826	0.000022	7.997669	7.995458	13.297367	1.983521	12.76507	-1.505872
25/08/99	13:24:50	L	5024.671N	00412.237W	17.972425	20.029535	-9.99	-0.02952	0.000021	-0.031328	0.000023	0.001826	0.000022	7.997669	7.995458	13.297367	1.983521	12.76507	-1.505872
25/08/99	13:25:00	L	5024.656N	00412.232W	17.973297	20.029161	-9.99	-0.02964	0.000023	-0.031336	0.000022	0.001796	0.000022	7.998334	7.995448	13.297367	1.983521	12.76507	-1.505872
25/08/99	13:25:10	L	5024.638N	00412.227W	17.977776	20.030405	-9.99	-0.02963	0.000024	-0.031342	0.000021	0.001815	0.000021	7.998161	7.995448	13.297367	1.983521	12.76507	-1.505872
25/08/99	13:25:20	L	5024.622N	00412.223W	17.973747	20.028913	-9.99	-0.02961	0.000019	-0.031318	0.000025	0.001708	0.000022	7.997254	7.995448	13.297367	1.983521	12.76507	-1.505872
25/08/99	13:25:30	L	5024.604N	00412.222W	17.919558	20.030281	-9.99	-0.02961	0.000019	-0.031318	0.000025	0.001708	0.000022	7.997254	7.995448	13.297367	1.983521	12.76507	-1.505872
25/08/99	13:25:40	L	5024.586N	00412.223W	17.887091	20.02879	-9.99	-0.02965	0.000025	-0.031191	0.000018	0.001866	0.000022	7.996994	7.995448	13.297367	1.983521	12.76507	-1.505872
25/08/99	13:25:50	L	5024.571N	00412.225W	17.825016	20.029535	-9.99	-0.02963	0.000024	-0.031242	0.000012	0.001742	0.000022	7.996994	7.995448	13.297367	1.983521	12.76507	-1.505872
25/08/99	13:26:00	L	5024.553N	00412.229W	17.814194	20.027174	-9.99	-0.02968	0.000024	-0.031242	0.000012	0.001742	0.000022	7.996994	7.995448	13.297367	1.983521	12.76507	-1.505872
25/08/99	13:26:10	L	5024.532N	00412.236W	17.849895	20.027546	-9.99	-0.029337	0.000024	-0.031242	0.000012	0.001742	0.000022	7.996994	7.995448	13.297367	1.983521	12.76507	-1.505872
25/08/99	13:26:20	L	5024.518N	00412.236W	17.827877	20.029161	-9.99	-0.029613	0.000018	-0.0313	0.000022	0.001787	0.000022	7.99688	7.994622	13.29686	1.991821	12.8202	-1.505872
25/08/99	13:26:30	L	5024.501N	00412.240W	17.867685	20.030629	-9.99	-0.02933	0.000024	-0.031234	0.000016	0.001904	0.000022	7.994576	7.991496	13.29921	1.997437	12.82562	-1.505969
25/08/99	13:26:40	L	5024.484N	00412.246W	17.879751	20.02767	-9.99	-0.02935	0.000025	-0.031277	0.000025	0.001742	0.000025	7.99814	7.99506	13.29921	1.997437	12.82562	-1.505969
25/08/99	13:26:50	L	5024.468N	00412.250W	17.923912	20.027546	-9.99	-0.029583	0.000026	-0.031367	0.000025	0.001785	0.000023	8.000066	8.006216	13.297866	1.988403	12.83682	-1.506067
25/08/99	13:27:00	L	5024.451N	00412.257W	17.991707	20.02892	-9.99	-0.029595	0.000026	-0.031367	0.000025	0.001785	0.000023	8.000066	8.006216	13.297866	1.988403	12.83682	-1.506067
25/08/99	13:27:10	L	5024.433N	00412.265W	17.923042	20.028542	-9.99	-0.029595	0.000026	-0.031367	0.000025	0.001785	0.000023	8.000066	8.006216	13.297866	1.988403	12.83682	-1.506067
25/08/99	13:27:20	L	5024.414N	00412.271W	17.867435	20.027552	-9.99	-0.03018	0.000055	-0.031471	0.000032	0.001291	0.000032	8.009295	8.006216	13.298919	1.983521	12.85353	-1.505896
25/08/99	13:27:30	L	5024.398N	00412.280W	17.900152	20.025588	-9.99	-0.029969	0.000049	-0.031509	0.000028	0.001291	0.000032	8.009295	8.006216	13.298919	1.983521	12.85353	-1.505896
25/08/99	13:27:40	L	5024.379N	00412.289W	17.97765	20.02892	-9.99	-0.02986	0.000025	-0.031527	0.000021	0.001691	0.000021	8.003463	8.003377	13.297073	1.974731	12.86582	-1.505981
25/08/99	13:27:50	L	5024.361N	00412.297W	18.043951	20.027546	-9.99	-0.029755	0.000017	-0.031391	0.000018	0.001636	0.000018	8.002143	8.003377	13.297215	1.983765	12.86436	-1.506116
25/08/99	13:28:00	L	5024.345N	00412.305W	17.950204	20.02792	-9.99	-0.03003	0.000024	-0.031577	0.000023	0.001547	0.000024	8.00786	8.003708	13.300009	1.987671	12.87555	-1.505933
25/08/99	13:28:10	L	5024.327N	00412.316W	18.031761	20.026304	-9.99	-0.030206	0.000024	-0.031779	0.00002	0.001625	0.000022	8.009465	8.006368	13.298443	1.979126	12.88094	-1.50592
25/08/99	13:28:20	L	5024.309N	00412.327W	18.093832	20.02688	-9.99	-0.030175	0.000024	-0.031801	0.000024	0.001573	0.000022	8.009465	8.006368	13.298443	1.979126	12.88094	-1.50592
25/08/99	13:28:30	L	5024.294N	00412.334W	17.997429	20.02705	-9.99	-0.03048	0.000024	-0.031847	0.000021	0.001572	0.000023	8.011093	8.008015	13.299019	1.985596	12.89177	-1.505884
25/08/99	13:28:40	L	5024.279N	00412.343W	17.988598	20.02705	-9.99	-0.03048	0.000024	-0.031847	0.000021	0.001572	0.000023	8.011093	8.008015	13.299019	1.985596	12.89177	-1.505884
25/08/99	13:28:50	L	5024.263N	00412.351W	18.040718	20.025309	-9.99	-0.03059	0.000021	-0.032246	0.000024	0.001647	0.000022	8.014615	8.011537	13.299711	1.982422	12.89756	-1.50603
25/08/99	13:29:00	L	5024.249N	00412.358W	18.071815	20.029411	-9.99	-0.03061	0.000024	-0.032246	0.000024	0.001647	0.000022	8.014615	8.011537	13.299711	1.982422	12.89756	-1.50603
25/08/99	13:29:10	L	5024.231N	00412.370W	18.058008	20.029411	-9.99	-0.03061	0.000024	-0.032246	0.000024	0.001647	0.000022	8.014615	8.011537	13.299711	1.982422	12.89756	-1.50603
25/08/99	13:29:20	L	5024.214N	00412.380W	18.061863	20.029411	-9.99	-0.03061	0.000024	-0.032246	0.000024	0.001647	0.000022	8.014615	8.011537	13.299711	1.982422	12.89756	-1.50603
25/08/99	13:29:30	L	5024.200N	00412.390W	18.053778	20.029411	-9.99	-0.03061	0.000024	-0.032246	0.000024	0.001647	0.000022	8.014615	8.011537	13.299711	1.982422	12.89756	-1.50603
25/08/99	13:29:40	L	5024.194N	00412.399W	18.124432	20.028416	-9.99	-0.030969	0.000022	-0.032556	0.000025	0.001587	0.000025	8.014615	8.011537	13.299711	1.982422	12.89756	-1.50603
25/08/99	13:29:50	L	5024.167N	00412.411W	18.12197	20.028416	-9.99	-0.030969	0.000022	-0.032556	0.000025	0.001587	0.000025	8.014615	8.011537	13.299711	1.982422	12.89756	-1.50603
25/08/99	13:30:00	L	5024.153N	00412.420W	18.12866	20.030157	-9.99	-0.030822	0.000022	-0.032556	0.000025	0.001587	0.000025	8.014615	8.011537	13.299711	1.982422	12.89756	-1.50603
25/08/99	13:30:10	L	5024.138N	00412.431W	18.128049	20.02796	-9.99	-0.031057	0.000021	-0.032821	0.000013	0.001737	0.000013	8.014615	8.011537	13.299711	1.982422	12.89756	-1.50603
25/08/99	13:30:20	L	5024.120N	00412.443W	18.116222	20.027796	-9.99	-0.031084	0.000021	-0.032821	0.000013	0.001737	0.000013	8.014615	8.011537	13.299711	1.982422	12.89756	-1.50603
25/08/99	13:30:30	L	5024.105N	00412.451W	18.110624	20.026552	-9.99	-0.031077	0.000016	-0.032844	0.000025	0.001737	0.000025	8.014615	8.011537	13.299711	1.982422	12.89756	-1.50603
25/08/99	13:30:40	L	5024.086N	00412.458W	18.088556	20.026552	-9.99	-0.03104	0.000016	-0.032844	0.000025	0.001737	0.000025	8.014615	8.011537	13.299711	1.982422	12.89756	-1.50603
25/08/99	13:30:50	L	5024.067N	00412.466W	18.117964	20.02688	-9.99	-0.030973	0.000022	-0.03279	0.000024	0.001817	0.000023	8.023298	8.020201	13.300935	1.98875	12.96893	-1.505823
25/08/99	13:31:00	L	5024.051N	00412.473W	18.11672	20.026667	-9.99	-0.030939	0.000022	-0.032758	0.000024	0.001817	0.000023	8.023298	8.020201	13.300935	1.98875	12.96893	-1.505823
25/08/99	13:31:10	L	5024.031N	00412.482W	18.099304	20.024439	-9.99	-0.030887	0.000017	-0.032707	0.000022	0.00182	0.000022	8.02179	8.018694	13.301679	1.9729	12.97973	-1.505969
25/0																			

25/08/99	13:31:30	L	5023.993N	00412.504W	18.084253	20.025309	-9.99	-0.030827	0.000023	-0.02821	0.000012	0.001794	0.000017	8.020727	8.017764	13.302505	1.967529	12.99083	-1.50592
25/08/99	13:31:40	L	5023.976N	00412.513W	18.105648	20.026428	-9.99	-0.030777	0.000019	-0.032582	0.000021	0.001806	0.00002	8.019882	8.016797	13.301786	1.971069	12.99826	-1.505872
25/08/99	13:31:50	L	5023.957N	00412.526W	18.117466	20.028147	-9.99	-0.030726	0.000021	-0.025235	0.000021	0.001808	0.000021	8.019028	8.015926	13.301419	1.966187	13.0016	-1.505981
25/08/99	13:32:00	L	5023.938N	00412.537W	18.108381	20.024439	-9.99	-0.030711	0.000024	-0.025239	0.000023	0.001828	0.000024	8.018746	8.015659	13.302132	1.966797	13.00736	-1.506018
25/08/99	13:32:10	L	5023.921N	00412.546W	18.095537	20.023195	-9.99	-0.030775	0.000023	-0.025235	0.000021	0.00176	0.000022	8.0191771	8.016682	13.301588	1.968384	13.01271	-1.505896
25/08/99	13:32:20	L	5023.901N	00412.552W	18.053406	20.026552	-9.99	-0.030848	0.000022	-0.032621	0.000014	0.001773	0.000018	8.021059	8.017972	13.303631	1.974976	13.01812	-1.505981
25/08/99	13:32:30	L	5023.882N	00412.549W	18.091219	20.024813	-9.99	-0.030869	0.000025	-0.032639	0.000024	0.00178	0.000024	8.021296	8.018201	13.302509	1.967896	13.02348	-1.505847
25/08/99	13:32:40	L	5023.863N	00412.539W	18.096319	20.0268	-9.99	-0.030902	0.000024	-0.0327	0.000025	0.001797	0.000024	8.022041	8.01895	13.303935	1.969118	13.02924	-1.50603
25/08/99	13:32:50	L	5023.849N	00412.522W	18.082264	20.023941	-9.99	-0.03089	0.00002	-0.032887	0.000017	0.00182	0.00002	8.021987	8.0189	13.304668	1.967041	13.03998	-1.505994
25/08/99	13:33:00	L	5023.833N	00412.501W	18.046066	20.025185	-9.99	-0.030902	0.000024	-0.032722	0.000017	0.00182	0.00002	8.021987	8.0189	13.304668	1.967041	13.03998	-1.505994
25/08/99	13:33:10	L	5023.819N	00412.484W	17.96347	20.023195	-9.99	-0.030898	0.000023	-0.032887	0.000023	0.001789	0.000023	8.021838	8.018747	13.303755	1.964478	13.04531	-1.50581
25/08/99	13:33:20	L	5023.802N	00412.467W	18.043081	20.023195	-9.99	-0.03125	0.000024	-0.03285	0.000023	0.001584	0.000024	8.020816	8.02492	13.303515	1.96521	13.05106	-1.50614
25/08/99	13:33:30	L	5023.787N	00412.446W	18.085373	20.024067	-9.99	-0.031426	0.000021	-0.03293	0.000022	0.001504	0.000021	8.031107	8.028007	13.303962	1.964722	13.05639	-1.505762
25/08/99	13:33:40	L	5023.775N	00412.427W	18.065098	20.021456	-9.99	-0.031577	0.000033	-0.033066	0.000014	0.001489	0.000024	8.033689	8.0306	13.302885	1.959595	13.06178	-1.505991
25/08/99	13:33:50	L	5023.761N	00412.404W	18.040842	20.023817	-9.99	-0.031761	0.00002	-0.033211	0.000015	0.00145	0.000018	8.036855	8.033761	13.303344	1.963867	13.0671	-1.505884
25/08/99	13:34:00	L	5023.747N	00412.383W	18.091489	20.023941	-9.99	-0.031508	0.000022	-0.033262	0.000023	0.001818	0.000024	8.03254	8.029445	13.304434	1.963135	13.07817	-1.50603
25/08/99	13:34:10	L	5023.733N	00412.366W	18.1054	20.023071	-9.99	-0.031511	0.000025	-0.033262	0.000023	0.001785	0.000022	8.02929	8.026214	13.303596	1.964722	13.08356	-1.505847
25/08/99	13:34:20	L	5023.719N	00412.346W	17.952024	20.024813	-9.99	-0.03133	0.000023	-0.033115	0.000017	0.001742	0.000022	8.032446	8.02937	13.302553	1.960449	13.08889	-1.505884
25/08/99	13:34:30	L	5023.699N	00412.310W	17.936476	20.022449	-9.99	-0.031436	0.000026	-0.033165	0.000017	0.001729	0.000022	8.031113	8.028034	13.302295	1.963745	13.09464	-1.505933
25/08/99	13:34:40	L	5023.672N	00412.292W	17.884354	20.02183	-9.99	-0.031374	0.000015	-0.033056	0.000016	0.001684	0.000015	8.029984	8.02691	13.302404	1.962524	13.09997	-1.505947
25/08/99	13:35:00	L	5023.656N	00412.273W	17.961105	20.022699	-9.99	-0.031593	0.000026	-0.033225	0.000022	0.001632	0.000024	8.033854	8.030777	13.301326	1.961914	13.10539	-1.50597
25/08/99	13:35:10	L	5023.644N	00412.254W	18.005514	20.02158	-9.99	-0.031716	0.000022	-0.033403	0.000016	0.001687	0.000019	8.036036	8.032949	13.302095	1.965576	13.11072	-1.505701
25/08/99	13:35:20	L	5023.629N	00412.234W	18.004023	20.021937	-9.99	-0.031724	0.000019	-0.033459	0.000013	0.001735	0.000016	8.03617	8.033066	13.302535	1.968018	13.11648	-1.505859
25/08/99	13:35:30	L	5023.612N	00412.215W	17.98698	20.023569	-9.99	-0.031787	0.00003	-0.033492	0.000024	0.001705	0.000027	8.037242	8.03416	13.302767	1.962158	13.12178	-1.505869
25/08/99	13:35:40	L	5023.596N	00412.196W	17.927519	20.023195	-9.99	-0.031425	0.000021	-0.033235	0.000024	0.001582	0.000023	8.030915	8.027835	13.304372	1.964233	13.12721	-1.505908
25/08/99	13:35:50	L	5023.581N	00412.179W	17.918688	20.024813	-9.99	-0.031682	0.000024	-0.033255	0.000018	0.001582	0.000021	8.035537	8.03245	13.306175	1.968994	13.13255	-1.505884
25/08/99	13:36:00	L	5023.566N	00412.159W	17.942945	20.0268	-9.99	-0.031978	0.000024	-0.033485	0.000024	0.001507	0.000024	8.040507	8.037424	13.306073	1.968506	13.13831	-1.505847
25/08/99	13:36:10	L	5023.550N	00412.139W	17.925777	20.026054	-9.99	-0.032112	0.000023	-0.033604	0.000015	0.001492	0.000019	8.042813	8.039728	13.305023	1.9729	13.14365	-1.505786
25/08/99	13:36:20	L	5023.537N	00412.121W	17.903387	20.024813	-9.99	-0.032119	0.000027	-0.033564	0.00002	0.001445	0.000023	8.042801	8.039829	13.302413	1.96814	13.14908	-1.505749
25/08/99	13:36:30	L	5023.523N	00412.099W	17.916897	20.02705	-9.99	-0.031805	0.000025	-0.033481	0.000024	0.001676	0.000025	8.037484	8.034404	13.305537	1.973287	13.15441	-1.505969
25/08/99	13:36:40	L	5023.509N	00412.077W	17.885349	20.026676	-9.99	-0.03167	0.000015	-0.033383	0.000024	0.001713	0.00002	8.03511	8.032036	13.3039	1.979736	13.1602	-1.505774
25/08/99	13:36:50	L	5023.497N	00412.057W	17.92441	20.027998	-9.99	-0.031816	0.000023	-0.033391	0.000023	0.001574	0.000023	8.037688	8.034602	13.304242	1.973022	13.16556	-1.50592
25/08/99	13:37:00	L	5023.487N	00412.037W	17.92441	20.027998	-9.99	-0.031839	0.000023	-0.03346	0.000015	0.00162	0.000021	8.038089	8.035001	13.300099	1.97522	13.17096	-1.505976
25/08/99	13:37:10	L	5023.467N	00412.018W	17.910851	20.02767	-9.99	-0.031972	0.000021	-0.033448	0.000021	0.001476	0.000021	8.040364	8.03729	13.302238	1.974609	13.17633	-1.50592
25/08/99	13:37:20	L	5023.453N	00412.002W	17.968943	20.028416	-9.99	-0.031672	0.000024	-0.033315	0.000016	0.001643	0.00002	8.03524	8.032152	13.29917	1.984375	13.18211	-1.505957
25/08/99	13:37:30	L	5023.437N	00411.984W	17.938217	20.028913	-9.99	-0.031648	0.000025	-0.033297	0.000022	0.001649	0.000024	8.034782	8.031707	13.298518	1.977763	13.1875	-1.505933
25/08/99	13:37:40	L	5023.422N	00411.967W	17.884354	20.029659	-9.99	-0.031542	0.000024	-0.033219	0.000021	0.001677	0.000022	8.032887	8.029819	13.300318	1.979736	13.19294	-1.505869
25/08/99	13:37:50	L	5023.408N	00411.952W	17.893711	20.030281	-9.99	-0.031608	0.000023	-0.033214	0.000012	0.001601	0.000017	8.035193	8.032113	13.301592	1.987549	13.20413	-1.505859
25/08/99	13:38:00	L	5023.393N	00411.932W	17.964952	20.031151	-9.99	-0.03167	0.000016	-0.033211	0.000008	0.001546	0.000012	8.035116	8.032034	13.297457	1.983521	13.20955	-1.506018
25/08/99	13:38:10	L	5023.379N	00411.912W	17.972425	20.029907	-9.99	-0.031665	0.000016	-0.033211	0.000008	0.001546	0.000012	8.035116	8.032034	13.297457	1.983521	13.20955	-1.506018
25/08/99	13:38:20	L	5023.366N	00411.895W	17.96342	20.030903	-9.99	-0.031608	0.000021	-0.033168	0.000017	0.00156	0.000019	8.034128	8.031039	13.29775	1.985962	13.21499	-1.505957
25/08/99	13:38:30	L	5023.349N	00411.880W	17.971556	20.034134	-9.99	-0.031623	0.000011	-0.033126	0.000012	0.001503	0.00002	8.034391	8.031306	13.29949	1.986338	13.22041	-1.505872
25/08/99	13:38:40	L	5023.332N	00411.866W	18.015839	20.029659	-9.99	-0.031698	0.000024	-0.03317	0.000018	0.001472	0.000021	8.035731	8.032647	13.295754	1.988647	13.22626	-1.505984
25/08/99	13:38:50	L	5023.317N	00411.852W	18.076916	20.033886	-9.99	-0.031921	0.000016	-0.033369	0.00002	0.001447	0.000018	8.039657	8.036565	13.295933	1.99646	13.23168	-1.505886
25/08/99	13:39:00	L	5023.302N	00411.832W	18.052086	20.033574	-9.99	-0.031973	0.00002	-0.033449	0.00002	0.001476	0.00002	8.040533	8.037441	13.297832	1.996094	13.2372	-1.505981
25/08/99	13:39:10	L	5023.287N	00411.814W	18.036737	20.035004	-9.99	-0.031955	0.000023	-0.033511	0.000019	0.001556	0.000021	8.040212	8.037115	13.296106	1.999023	13.24262	-1.505749
25/08/99	13:39:20	L	5023.272N	00411.802W	18.052784	20.03289	-9.99	-0.031933	0.000024	-0.033523	0.000023	0.00159	0.000024	8.039936	8.03675	13.295756	1.99353	13.24843	-1.505713
25/08/99	13:39:30	L	5023.255N	00411.790W	18.100822	20.033512	-9.99	-0.031988	0.000024	-0.033528	0.000024	0.00153	0.000024	8.041017	8.03792	13.295268	1.995728	13.25386	-1.505969

25/08/99	13:39:40	L	5023:238N	00411:777W	18.081117	20.035128	-9.99	-0.031968	0.000019	-0.033522	0.000023	0.001554	0.000021	8.040449	8.037363	13.295933	2.003418	13.25938	-1.505994
25/08/99	13:39:50	L	5023:222N	00411:766W	18.084457	20.034756	-9.99	-0.032054	0.000023	-0.033547	0.000022	0.001493	0.000022	8.041954	8.038558	13.29606	1.999146	13.26483	-1.50581
25/08/99	13:40:00	L	5023:203N	00411:756W	18.084129	20.037117	-9.99	-0.03203	0.000024	-0.033558	0.000014	0.001528	0.000019	8.041544	8.038458	13.29541	2.004761	13.2707	-1.505872
25/08/99	13:40:10	L	5023:186N	00411:740W	18.115475	20.033636	-9.99	-0.032058	0.000019	-0.033562	0.000018	0.001573	0.000019	8.040569	8.037486	13.295212	2.009033	13.28166	-1.505762
25/08/99	13:40:20	L	5023:168N	00411:727W	18.082611	20.037117	-9.99	-0.031975	0.000021	-0.033548	0.000016	0.001593	0.000017	8.038527	8.035452	13.29494	2.006789	13.27754	-1.505635
25/08/99	13:40:30	L	5023:152N	00411:715W	17.982101	20.036619	-9.99	-0.031963	0.000019	-0.033419	0.000021	0.001527	0.000023	8.039073	8.035995	13.294029	2.012451	13.29238	-1.505647
25/08/99	13:40:40	L	5023:133N	00411:703W	18.005266	20.037863	-9.99	-0.031892	0.000024	-0.033419	0.000021	0.001545	0.000021	8.037583	8.034505	13.294067	2.018555	13.29844	-1.505633
25/08/99	13:40:50	L	5023:114N	00411:682W	18.004519	20.038111	-9.99	-0.031806	0.000023	-0.033445	0.000022	0.001585	0.000021	8.037832	8.034748	13.293322	2.007769	13.30398	-1.505669
25/08/99	13:41:00	L	5023:099N	00411:683W	17.932247	20.036745	-9.99	-0.031824	0.000021	-0.033411	0.000016	0.001678	0.000024	8.037832	8.034748	13.293322	2.007769	13.30398	-1.505669
25/08/99	13:41:10	L	5023:083N	00411:674W	17.919186	20.037615	-9.99	-0.031768	0.000015	-0.033293	0.000023	0.001525	0.000019	8.036848	8.033766	13.290198	2.014404	13.30945	-1.505694
25/08/99	13:41:20	L	5023:065N	00411:664W	17.910477	20.036247	-9.99	-0.031549	0.000024	-0.033228	0.000023	0.001678	0.000024	8.036848	8.033766	13.290198	2.014404	13.30945	-1.505694
25/08/99	13:41:30	L	5023:049N	00411:656W	17.876516	20.039354	-9.99	-0.031468	0.000017	-0.033111	0.000019	0.001654	0.000019	8.034238	8.029346	13.292994	2.018311	13.32636	-1.505796
25/08/99	13:41:40	L	5023:032N	00411:645W	17.852757	20.038733	-9.99	-0.031401	0.000024	-0.033066	0.000013	0.001654	0.000019	8.034238	8.029346	13.292994	2.018311	13.32636	-1.505796
25/08/99	13:41:50	L	5023:014N	00411:637W	17.844671	20.041468	-9.99	-0.031401	0.000024	-0.033066	0.000013	0.001654	0.000019	8.034238	8.029346	13.292994	2.018311	13.32636	-1.505796
25/08/99	13:42:00	L	5022:981N	00411:631W	17.832977	20.037987	-9.99	-0.031357	0.000025	-0.032987	0.000023	0.00164	0.000024	8.029633	8.026565	13.293809	2.021851	13.33776	-1.506152
25/08/99	13:42:10	L	5022:962N	00411:620W	17.745897	20.038361	-9.99	-0.031199	0.000024	-0.032866	0.000011	0.00159	0.000023	8.029633	8.026565	13.293809	2.021851	13.33776	-1.506152
25/08/99	13:42:20	L	5022:949N	00411:609W	17.667772	20.038933	-9.99	-0.031276	0.000005	-0.032866	0.000011	0.00159	0.000023	8.029633	8.026565	13.293809	2.021851	13.33776	-1.506152
25/08/99	13:42:30	L	5022:929N	00411:600W	17.749008	20.037615	-9.99	-0.031276	0.000025	-0.033011	0.000019	0.001468	0.000022	8.029633	8.026565	13.293809	2.021851	13.33776	-1.506152
25/08/99	13:42:40	L	5022:912N	00411:586W	17.676729	20.038619	-9.99	-0.03132	0.000024	-0.032786	0.000013	0.001642	0.000014	8.029633	8.026565	13.293809	2.021851	13.33776	-1.506152
25/08/99	13:43:00	L	5022:898N	00411:581W	17.657074	20.039852	-9.99	-0.031127	0.000013	-0.032786	0.000013	0.001533	0.000022	8.029633	8.026565	13.293809	2.021851	13.33776	-1.506152
25/08/99	13:43:10	L	5022:878N	00411:571W	17.60445	20.039485	-9.99	-0.03119	0.000023	-0.032786	0.000013	0.001533	0.000022	8.029633	8.026565	13.293809	2.021851	13.33776	-1.506152
25/08/99	13:43:20	L	5022:862N	00411:563W	17.627838	20.039876	-9.99	-0.031334	0.000023	-0.032786	0.000023	0.001449	0.000023	8.029633	8.026565	13.293809	2.021851	13.33776	-1.506152
25/08/99	13:43:30	L	5022:847N	00411:556W	17.6516	20.039323	-9.99	-0.031209	0.000027	-0.032798	0.000024	0.001589	0.000026	8.026876	8.023822	13.289446	2.029831	13.38827	-1.50603
25/08/99	13:43:40	L	5022:831N	00411:549W	17.640404	20.040846	-9.99	-0.031151	0.000021	-0.032786	0.000023	0.001635	0.000025	8.026876	8.023822	13.289446	2.029831	13.38827	-1.50603
25/08/99	13:43:50	L	5022:816N	00411:535W	17.579319	20.039854	-9.99	-0.031091	0.000021	-0.032786	0.000016	0.001679	0.000018	8.024755	8.021704	13.290491	2.030762	13.39979	-1.506116
25/08/99	13:44:00	L	5022:802N	00411:527W	17.517488	20.041965	-9.99	-0.031088	0.000018	-0.032709	0.000024	0.001651	0.000021	8.024636	8.02159	13.290217	2.041992	13.4053	-1.506116
25/08/99	13:44:10	L	5022:787N	00411:522W	17.578075	20.040474	-9.99	-0.031135	0.000017	-0.032768	0.000014	0.001633	0.000015	8.025528	8.022466	13.289992	2.031982	13.41083	-1.505859
25/08/99	13:44:20	L	5022:770N	00411:514W	17.54884	20.042711	-9.99	-0.031108	0.000024	-0.032724	0.000018	0.001616	0.000021	8.02502	8.021968	13.290888	2.043091	13.41646	-1.505749
25/08/99	13:44:30	L	5022:754N	00411:505W	17.526824	20.040722	-9.99	-0.030992	0.000021	-0.032636	0.000023	0.001645	0.000022	8.022984	8.019934	13.28774	2.034424	13.42239	-1.506018
25/08/99	13:44:40	L	5022:742N	00411:493W	17.504175	20.040977	-9.99	-0.03136	0.000026	-0.032675	0.000023	0.001632	0.000021	8.022984	8.019934	13.28774	2.034424	13.42239	-1.506018
25/08/99	13:44:50	L	5022:727N	00411:483W	17.471581	20.039602	-9.99	-0.031013	0.000024	-0.03262	0.000013	0.001608	0.000019	8.022984	8.019934	13.28774	2.034424	13.42239	-1.506018
25/08/99	13:45:00	L	5022:713N	00411:475W	17.465733	20.042337	-9.99	-0.031082	0.000024	-0.03262	0.000013	0.001608	0.000019	8.022984	8.019934	13.28774	2.034424	13.42239	-1.506018
25/08/99	13:45:10	L	5022:701N	00411:469W	17.470709	20.041592	-9.99	-0.031082	0.000024	-0.03262	0.000013	0.001608	0.000019	8.022984	8.019934	13.28774	2.034424	13.42239	-1.506018
25/08/99	13:45:20	L	5022:687N	00411:464W	17.466604	20.044327	-9.99	-0.031002	0.000024	-0.032563	0.000022	0.001468	0.000025	8.024462	8.021418	13.289143	2.051147	13.4507	-1.505967
25/08/99	13:45:30	L	5022:668N	00411:455W	17.442219	20.043083	-9.99	-0.031082	0.000027	-0.03255	0.000024	0.001468	0.000025	8.024462	8.021418	13.289143	2.051147	13.4507	-1.505967
25/08/99	13:45:40	L	5022:651N	00411:446W	17.457771	20.044327	-9.99	-0.031002	0.000024	-0.032563	0.000022	0.001468	0.000025	8.024462	8.021418	13.289143	2.051147	13.4507	-1.505967
25/08/99	13:45:50	L	5022:635N	00411:437W	17.453167	20.044203	-9.99	-0.031105	0.000026	-0.032563	0.000022	0.001468	0.000025	8.024462	8.021418	13.289143	2.051147	13.4507	-1.505967
25/08/99	13:46:00	L	5022:616N	00411:428W	17.434629	20.044575	-9.99	-0.031071	0.000022	-0.032563	0.000022	0.001468	0.000025	8.024462	8.021418	13.289143	2.051147	13.4507	-1.505967
25/08/99	13:46:10	L	5022:597N	00411:422W	17.466804	20.046316	-9.99	-0.03118	0.000021	-0.032563	0.000022	0.001468	0.000025	8.024462	8.021418	13.289143	2.051147	13.4507	-1.505967
25/08/99	13:46:20	L	5022:580N	00411:418W	17.469341	20.045197	-9.99	-0.03111	0.000023	-0.032563	0.000022	0.001468	0.000025	8.024462	8.021418	13.289143	2.051147	13.4507	-1.505967
25/08/99	13:46:30	L	5022:562N	00411:408W	17.504549	20.045073	-9.99	-0.031438	0.000023	-0.032563	0.000022	0.001468	0.000025	8.024462	8.021418	13.289143	2.051147	13.4507	-1.505967
25/08/99	13:46:40	L	5022:544N	00411:395W	17.461752	20.04752	-9.99	-0.031176	0.000019	-0.032563	0.000022	0.001468	0.000025	8.024462	8.021418	13.289143	2.051147	13.4507	-1.505967
25/08/99	13:46:50	L	5022:527N	00411:387W	17.41547	20.043953	-9.99	-0.031125	0.000022	-0.032563	0.000022	0.001468	0.000025	8.024462	8.021418	13.289143	2.051147	13.4507	-1.505967
25/08/99	13:47:00	L	5022:507N	00411:383W	17.444084	20.047682	-9.99	-0.031203	0.000026	-0.032563	0.000022	0.001468	0.000025	8.024462	8.021418	13.289143	2.051147	13.4507	-1.505967
25/08/99	13:47:10	L	5022:470N	00411:381W	17.519976	20.046812	-9.99	-0.031227	0.000026	-0.032563	0.000022	0.001468	0.000025	8.024462	8.021418	13.289143	2.051147	13.4507	-1.505967
25/08/99	13:47:20	L	5022:449N	00411:376W	17.50654	20.046812	-9.99	-0.031334	0.000027	-0.032563	0.000022	0.001468	0.000025	8.024462	8.021418	13.289143	2.051147	13.4507	-1.505967
25/08/99	13:47:30	L	5022:431N	00411:377W	17.530054	20.046936	-9.99	-0.031334	0.000027	-0.032563	0.000022	0.001468	0.000025	8.024462	8.021418	13.289143	2.051147	13.4507	-1.505967
25/08/99	13:47:40	L	5022:411N	00411:374W	17.544235	20.047682	-9.99	-0.031506	0.000025	-0.032563	0.000022	0.001468	0.000025	8.024462	8.021418	13.289143	2.051147		

25/08/99	13:47:50 L	5022.416N	00411.361W	17.49696	20.048428	-9.99	-0.031024	0.000026	-0.032791	0.000024	0.001467	0.000025	8.028707	8.025662	13.286831	2.07251	13.53656	-1.505984
25/08/99	13:48:00 L	5022.397N	00411.358W	17.42194	20.04731	-9.99	-0.031116	0.000023	-0.032668	0.000012	0.001552	0.000018	8.025028	8.02198	13.284371	2.068115	13.54213	-1.506042
25/08/99	13:48:10 L	5022.378N	00411.351W	17.430027	20.048656	-9.99	-0.031253	0.000024	-0.032749	0.000024	0.001496	0.000024	8.027408	8.024364	13.279818	2.075317	13.55339	-1.505847
25/08/99	13:48:20 L	5022.362N	00411.343W	17.390587	20.049671	-9.99	-0.031003	0.000025	-0.032624	0.000012	0.001621	0.000019	8.020325	8.019989	13.287928	2.074951	13.55339	-1.505859
25/08/99	13:48:30 L	5022.343N	00411.335W	17.319794	20.046677	-9.99	-0.031083	0.000017	-0.032589	0.000023	0.001506	0.00002	8.024339	8.021305	13.284067	2.073975	13.55965	-1.505984
25/08/99	13:48:40 L	5022.324N	00411.332W	17.347912	20.048428	-9.99	-0.03113	0.000017	-0.032648	0.000024	0.001519	0.000021	8.025179	8.022149	13.283048	2.074341	13.56515	-1.505748
25/08/99	13:48:50 L	5022.306N	00411.328W	17.375658	20.049795	-9.99	-0.031194	0.000023	-0.032689	0.000024	0.001495	0.000023	8.026326	8.023287	13.284972	2.078979	13.57644	-1.506067
25/08/99	13:49:00 L	5022.291N	00411.322W	17.318426	20.047434	-9.99	-0.031262	0.000013	-0.03264	0.00002	0.001417	0.000025	8.027451	8.02441	13.281548	2.070679	13.57644	-1.505981
25/08/99	13:49:10 L	5022.273N	00411.311W	17.253727	20.049671	-9.99	-0.031127	0.000013	-0.03264	0.00002	0.001513	0.000018	8.025036	8.022003	13.285609	2.077393	13.58266	-1.505945
25/08/99	13:49:20 L	5022.255N	00411.302W	17.231083	20.04731	-9.99	-0.031136	0.000013	-0.032653	0.000023	0.001517	0.00002	8.025165	8.022098	13.287814	2.075806	13.58819	-1.506079
25/08/99	13:49:30 L	5022.238N	00411.296W	17.227972	20.048553	-9.99	-0.031134	0.000017	-0.032674	0.000016	0.00154	0.000016	8.025136	8.022098	13.286294	2.077271	13.59944	-1.506067
25/08/99	13:49:40 L	5022.217N	00411.283W	17.218641	20.045197	-9.99	-0.031258	0.000024	-0.032718	0.000021	0.00146	0.000023	8.027276	8.024241	13.284811	2.068115	13.59944	-1.50592
25/08/99	13:49:50 L	5022.198N	00411.283W	17.224861	20.04731	-9.99	-0.0313	0.000025	-0.032736	0.000023	0.001436	0.000024	8.028008	8.024976	13.284162	2.071289	13.60562	-1.505933
25/08/99	13:50:00 L	5022.181N	00411.280W	17.226231	20.046564	-9.99	-0.031274	0.000019	-0.03274	0.000024	0.001466	0.000021	8.027549	8.024526	13.286223	2.072754	13.61122	-1.50592
25/08/99	13:50:10 L	5022.159N	00411.278W	17.215157	20.043316	-9.99	-0.031276	0.000015	-0.032762	0.000017	0.001487	0.000016	8.027571	8.02455	13.28391	2.070435	13.61685	-1.505798
25/08/99	13:50:20 L	5022.138N	00411.273W	17.215904	20.048316	-9.99	-0.031447	0.000024	-0.032811	0.000018	0.001364	0.000021	8.030055	8.027519	13.284516	2.065674	13.62296	-1.505835
25/08/99	13:50:30 L	5022.118N	00411.269W	17.214411	20.043581	-9.99	-0.03143	0.000019	-0.032801	0.000023	0.001371	0.000021	8.03025	8.027222	13.286091	2.05542	13.62966	-1.506104
25/08/99	13:50:40 L	5022.095N	00411.263W	17.25634	20.044203	-9.99	-0.031323	0.000021	-0.032815	0.000013	0.001492	0.000023	8.032442	8.025407	13.285076	2.065552	13.63419	-1.505884
25/08/99	13:50:50 L	5022.073N	00411.256W	17.367197	20.044079	-9.99	-0.031577	0.00002	-0.032844	0.000025	0.001368	0.000023	8.032969	8.029923	13.285178	2.061157	13.6454	-1.505945
25/08/99	13:51:00 L	5022.053N	00411.247W	17.477179	20.045321	-9.99	-0.031432	0.000023	-0.032861	0.000018	0.001528	0.000021	8.030569	8.027515	13.284876	2.064841	13.6454	-1.505945
25/08/99	13:51:10 L	5022.033N	00411.233W	17.472202	20.045942	-9.99	-0.031406	0.000026	-0.032941	0.000024	0.001534	0.000025	8.030112	8.027099	13.287125	2.067993	13.65157	-1.506079
25/08/99	13:51:20 L	5022.013N	00411.215W	17.430773	20.045197	-9.99	-0.031297	0.000024	-0.032861	0.000018	0.001564	0.000021	8.028167	8.025128	13.28519	2.064697	13.65711	-1.505884
25/08/99	13:51:30 L	5021.995N	00411.202W	17.385859	20.045942	-9.99	-0.031194	0.000025	-0.032775	0.000018	0.001581	0.000021	8.028337	8.025128	13.285561	2.067505	13.66274	-1.505969
25/08/99	13:51:40 L	5021.974N	00411.188W	17.343931	20.045073	-9.99	-0.031107	0.000024	-0.032673	0.000015	0.001566	0.00002	8.024782	8.021746	13.285501	2.064087	13.66885	-1.50592
25/08/99	13:51:50 L	5021.958N	00411.170W	17.28981	20.043705	-9.99	-0.031063	0.000024	-0.032573	0.000015	0.001509	0.00002	8.023965	8.020928	13.283547	2.061401	13.67452	-1.506067
25/08/99	13:52:00 L	5021.946N	00411.156W	17.244644	20.045444	-9.99	-0.031233	0.000017	-0.032663	0.000018	0.00143	0.000018	8.02586	8.023833	13.286367	2.067871	13.68008	-1.506116
25/08/99	13:52:10 L	5021.931N	00411.141W	17.163273	20.047186	-9.99	-0.031483	0.000035	-0.032865	0.000024	0.001392	0.000022	8.031297	8.028266	13.286963	2.06897	13.6913	-1.506091
25/08/99	13:52:20 L	5021.919N	00411.122W	17.146351	20.046564	-9.99	-0.031574	0.000023	-0.032972	0.00002	0.001398	0.000021	8.032679	8.029655	13.286141	2.067139	13.6913	-1.506079

25/08/99	13:52:30 L	5021.911N	00411.104W	17.151577	20.046999	-9.99	-0.03143	0.00002	-0.03292	0.000018	0.00149	0.000019	8.030183	8.027161	13.283362	2.064697	13.69746	-1.506006
25/08/99	13:52:40 L	5021.901N	00411.086W	17.141748	20.04619	-9.99	-0.03147	0.000018	-0.032913	0.000014	0.001442	0.000016	8.030881	8.027863	13.28386	2.068115	13.70305	-1.505872
25/08/99	13:52:50 L	5021.890N	00411.069W	17.138689	20.046936	-9.99	-0.031477	0.000017	-0.032915	0.000016	0.001438	0.000017	8.03101	8.027983	13.285211	2.073853	13.70866	-1.505847
25/08/99	13:53:00 L	5021.881N	00411.050W	17.211798	20.045942	-9.99	-0.031446	0.000028	-0.032927	0.000021	0.001481	0.000024	8.030528	8.027497	13.285495	2.070679	13.71476	-1.505884
25/08/99	13:53:10 L	5021.876N	00411.030W	17.215904	20.045818	-9.99	-0.031378	0.000018	-0.032879	0.000021	0.001501	0.00002	8.029355	8.026321	13.281515	2.069824	13.72048	-1.506018
25/08/99	13:53:20 L	5021.872N	00411.008W	17.216526	20.04644	-9.99	-0.031464	0.00002	-0.032883	0.000023	0.001419	0.000021	8.030849	8.027815	13.283307	2.073486	13.72601	-1.50592
25/08/99	13:53:30 L	5021.866N	00410.987W	17.264303	20.04644	-9.99	-0.031383	0.000021	-0.032869	0.000016	0.001486	0.000018	8.029483	8.026456	13.283434	2.071655	13.73168	-1.505786
25/08/99	13:53:40 L	5021.857N	00410.944W	17.208626	20.047558	-9.99	-0.031372	0.000025	-0.032827	0.000023	0.001456	0.000022	8.028779	8.026456	13.283434	2.071655	13.73168	-1.505786
25/08/99	13:54:00 L	5021.854N	00410.920W	17.207691	20.04644	-9.99	-0.031569	0.000023	-0.03285	0.000025	0.001291	0.000024	8.032478	8.026294	13.284013	2.075806	13.74347	-1.506165
25/08/99	13:54:10 L	5021.850N	00410.898W	17.187536	20.047062	-9.99	-0.031482	0.00002	-0.032819	0.000023	0.001377	0.000022	8.031083	8.026067	13.282802	2.08135	13.76558	-1.505859
25/08/99	13:54:20 L	5021.845N	00410.872W	17.155186	20.049336	-9.99	-0.031454	0.000025	-0.032832	0.000023	0.001456	0.000023	8.03195	8.026867	13.283517	2.08667	13.77218	-1.505969
25/08/99	13:54:30 L	5021.839N	00410.824W	17.138885	20.048677	-9.99	-0.031636	0.000024	-0.032815	0.000018	0.001279	0.000021	8.030724	8.026867	13.283517	2.08667	13.77218	-1.505969
25/08/99	13:54:40 L	5021.833N	00410.798W	17.132042	20.047808	-9.99	-0.031529	0.000017	-0.032824	0.00002	0.001395	0.000019	8.031887	8.026867	13.282067	2.080811	13.7835	-1.505884
25/08/99	13:55:00 L	5021.825N	00410.772W	17.137144	20.047682	-9.99	-0.031676	0.000017	-0.032858	0.00002	0.001282	0.000021	8.030857	8.026867	13.282067	2.080811	13.7835	-1.505884
25/08/99	13:55:10 L	5021.816N	00410.747W	17.142618	20.050417	-9.99	-0.031815	0.000021	-0.033124	0.000021	0.001309	0.000021	8.030857	8.026867	13.282067	2.080811	13.7835	-1.505884
25/08/99	13:55:20 L	5021.812N	00410.720W	17.132292	20.047932	-9.99	-0.031822	0.000023	-0.033229	0.000024	0.001408	0.000024	8.030857	8.026867	13.282067	2.080811	13.7835	-1.505884
25/08/99	13:55:30 L	5021.806N	00410.695W	17.132168	20.049299	-9.99	-0.031866	0.000019	-0.033268	0.00002	0.001394	0.000018	8.030857	8.026867	13.282067	2.080811	13.7835	-1.505884
25/08/99	13:55:40 L	5021.800N	00410.643W	17.132292	20.050417	-9.99	-0.031887	0.000026	-0.033337	0.000025	0.001377	0.000023	8.030857	8.026867	13.282067	2.080811	13.7835	-1.505884
25/08/99	13:56:00 L	5021.798N	00410.616W	17.148716	20.050541	-9.99	-0.032011	0.000021	-0.033337	0.000025	0.001377	0.000023	8.030857	8.026867	13.282067	2.080811	13.7835	-1.505884
25/08/99	13:56:10 L	5021.793N	00410.594W	17.140131	20.050169	-9.99	-0.031874	0.00002	-0.033323	0.000022	0.001448	0.000021	8.030857	8.026867	13.282067	2.080811	13.7835	-1.505884
25/08/99	13:56:20 L	5021.789N	00410.568W	17.125572	20.049919	-9.99	-0.031967	0.000025	-0.033334	0.000025	0.001377	0.000023	8.030857	8.026867	13.282067	2.080811	13.7835	-1.505884
25/08/99	13:56:30 L	5021.786N	00410.541W	17.108896	20.051908	-9.99	-0.03194	0.000025	-0.033334	0.000025	0.001377	0.000023	8.030857	8.026867	13.282067	2.080811	13.7835	-1.505884
25/08/99	13:56:40 L	5021.781N	00410.518W	17.094465	20.051411	-9.99	-0.031887	0.000026	-0.033337	0.000025	0.001377	0.000023	8.030857	8.026867	13.282067	2.080811	13.7835	-1.505884
25/08/99	13:56:50 L	5021.775N	00410.492W	17.06983	20.051039	-9.99	-0.032001	0.000025	-0.033336	0.000025	0.001377	0.000023	8.030857	8.026867	13.282067	2.080811	13.7835	-1.505884
25/08/99	13:57:00 L	5021.765N	00410.470W	17.098074	20.051287	-9.99	-0.032006	0.000021	-0.033337	0.00002	0.001351	0.000021	8.040131	8.037109	13.279699	2.092163	13.85366	-1.505987
25/08/99	13:57:10 L	5021.759N	00410.453W	17.107283	20.051661	-9.99	-0.031999	0.000026	-0.033378	0.000024	0.001379	0.000025	8.040012	8.036996	13.279276	2.096069	13.85942	-1.505823
25/08/99	13:57:20 L	5021.754N	00410.436W	17.106037	20.052156	-9.99	-0.03201	0.000019	-0.033373	0.000023	0.001363	0.000021	8.040208	8.037186	13.279632	2.099609	13.86508	-1.505957
25/08/99	13:57:30 L	5021.752N	00410.420W	17.107157	20.05276	-9.99	-0.032068	0.000016	-0.033406	0.000015	0.001339	0.000015	8.041207	8.038194	13.279617	2.105347	13.87082	-1.506104
25/08/99	13:57:40 L	5021.742N	00410.401W	17.105665	20.052854	-9.99	-0.032053	0.000021	-0.033398	0.000019	0.001345	0.00002	8.04095	8.037933	13.279696	2.109638	13.87704	-1.506274
25/08/99	13:57:50 L	5021.739N	00410.386W	17.126568	20.051163	-9.99	-0.032019	0.000032	-0.033403	0.000016	0.001384	0.000024	8.040391	8.037362	13.279276	2.096069	13.88279	-1.50614
25/08/99	13:58:00 L	5021.731N	00410.365W	17.132914	20.05427	-9.99	-0.032048	0.000025	-0.033368	0.000023	0.00132	0.000024	8.040893	8.037872	13.282044	2.11377	13.88841	-1.506189
25/08/99	13:58:10 L	5021.677N	00410.348W	17.131794	20.0534	-9.99	-0.031957	0.000023	-0.033352	0.000019	0.001394	0.000021	8.039321	8.036291	13.279572	2.100852	13.89418	-1.506042
25/08/99	13:58:20 L	5021.665N	00410.334W	17.141499	20.052778	-9.99	-0.031922	0.000019	-0.033328	0.000024	0.001407	0.000022	8.038708	8.035692	13.278516	2.111938	13.9004	-1.506006
25/08/99	13:58:30 L	5021.651N	00410.317W	17.136148	20.05148	-9.99	-0.031954	0.000022	-0.033366	0.000018	0.001412	0.00002	8.038274	8.035243	13.281126	2.112183	13.90617	-1.506201
25/08/99	13:58:40 L	5021.641N	00410.298W	17.172606	20.05253	-9.99	-0.031915	0.000017	-0.033351	0.000018	0.001436	0.000017	8.03829	8.035692	13.279572	2.112183	13.91184	-1.506006
25/08/99	13:58:50 L	5021.629N	00410.282W	17.180443	20.054394	-9.99	-0.031981	0.000024	-0.03334	0.000026	0.001359	0.000025	8.039771	8.036753	13.279957	2.12183	13.91755	-1.506201
25/08/99	13:59:00 L	5021.617N	00410.266W	17.154936	20.053648	-9.99	-0.031978	0.000023	-0.03325	0.000023	0.001347	0.000023	8.039702	8.036677	13.279683	2.109253	13.92378	-1.506104
25/08/99	13:59:10 L	5021.606N	00410.246W	17.149712	20.053028	-9.99	-0.031955	0.000025	-0.033334	0.000025	0.001379	0.000024	8.039305	8.036273	13.278189	2.108643	13.92956	-1.505957
25/08/99	13:59:20 L	5021.597N	00410.227W	17.145853	20.053162	-9.99	-0.03197	0.000021	-0.033312	0.000015	0.001341	0.000018	8.039557	8.03653	13.277056	2.107422	13.93523	-1.506018
25/08/99	13:59:30 L	5021.585N	00410.203W	17.167379	20.053276	-9.99	-0.032024	0.00002	-0.03334	0.000025	0.001316	0.000022	8.040509	8.037488	13.278227	2.109863	13.94097	-1.50603

25/08/99	13:59:40	L	5021.574N	00410.178W	17.096954	20.05452	-9.99	-0.032341	0.000024	-0.033334	0.000024	0.000992	0.000024	8.045952	8.042925	13.277038	2.108032	13.9472	-1.505994
25/08/99	13:59:50	L	5021.566N	00410.156W	17.051912	20.054644	-9.99	-0.032074	0.000021	-0.033381	0.000024	0.001306	0.000023	8.04127	8.038246	13.278116	2.108643	13.95298	-1.506201
25/08/99	14:00:00	L	5021.554N	00410.133W	17.043575	20.054427	-9.99	-0.032265	0.000018	-0.033427	0.000024	0.001162	0.000021	8.045566	8.041555	13.278131	2.117065	13.95866	-1.505957
25/08/99	14:00:10	L	5021.542N	00410.115W	17.021177	20.054394	-9.99	-0.032118	0.00002	-0.033465	0.000019	0.001348	0.00002	8.04199	8.038981	13.278496	2.114824	13.96441	-1.506091
25/08/99	14:00:20	L	5021.530N	00410.103W	17.026403	20.054768	-9.99	-0.032223	0.000023	-0.033572	0.000024	0.00135	0.000023	8.043823	8.04081	13.278313	2.115845	13.97067	-1.506165
25/08/99	14:00:30	L	5021.518N	00410.081W	17.020681	20.054146	-9.99	-0.032446	0.000026	-0.033634	0.000024	0.001188	0.000025	8.047686	8.044678	13.278184	2.112793	13.97647	-1.505981
25/08/99	14:00:40	L	5021.505N	00410.062W	17.020555	20.054394	-9.99	-0.032424	0.000023	-0.033672	0.000024	0.001248	0.000024	8.04731	8.044296	13.276652	2.113159	13.98214	-1.505933
25/08/99	14:00:50	L	5021.492N	00410.047W	17.02316	20.054022	-9.99	-0.032227	0.000024	-0.033613	0.000019	0.001386	0.000022	8.04389	8.040878	13.277876	2.112549	13.98791	-1.50603
25/08/99	14:01:00	L	5021.479N	00410.027W	17.033745	20.053524	-9.99	-0.032261	0.000025	-0.033548	0.000023	0.001287	0.000019	8.043105	8.040817	13.276998	2.111328	13.99412	-1.506079
25/08/99	14:01:10	L	5021.468N	00410.010W	17.102428	20.053079	-9.99	-0.032238	0.000025	-0.033486	0.000024	0.001248	0.000024	8.044217	8.04119	13.279476	2.114502	13.99993	-1.506189
25/08/99	14:01:20	L	5021.452N	00409.990W	17.156927	20.054394	-9.99	-0.032063	0.000021	-0.033441	0.000024	0.001356	0.000017	8.041182	8.038155	13.278926	2.117554	14.00561	-1.506042
25/08/99	14:01:30	L	5021.439N	00409.968W	17.169992	20.054644	-9.99	-0.032095	0.000023	-0.033441	0.000023	0.001346	0.000023	8.041749	8.038213	13.27986	2.118286	14.01138	-1.505981
25/08/99	14:01:40	L	5021.426N	00409.948W	17.169992	20.054644	-9.99	-0.032095	0.000023	-0.033441	0.000023	0.001346	0.000023	8.041749	8.038213	13.27986	2.118286	14.01138	-1.505981
25/08/99	14:01:50	L	5021.413N	00409.923W	17.169992	20.054644	-9.99	-0.032095	0.000023	-0.033441	0.000023	0.001346	0.000023	8.041749	8.038213	13.27986	2.118286	14.01138	-1.505981
25/08/99	14:02:00	L	5021.400N	00409.901W	17.169992	20.054644	-9.99	-0.032095	0.000023	-0.033441	0.000023	0.001346	0.000023	8.041749	8.038213	13.27986	2.118286	14.01138	-1.505981
25/08/99	14:02:10	L	5021.387N	00409.878W	17.157789	20.055885	-9.99	-0.032162	0.000015	-0.033481	0.000018	0.001251	0.000019	8.04621	8.041597	13.27809	2.115479	14.02909	-1.506104
25/08/99	14:02:20	L	5021.374N	00409.856W	17.130922	20.053774	-9.99	-0.032169	0.000015	-0.033481	0.000018	0.001251	0.000019	8.04621	8.041597	13.27809	2.115479	14.02909	-1.506104
25/08/99	14:02:30	L	5021.361N	00409.836W	17.134531	20.055016	-9.99	-0.032251	0.000015	-0.033481	0.000018	0.001251	0.000019	8.04621	8.041597	13.27809	2.115479	14.02909	-1.506104
25/08/99	14:02:40	L	5021.348N	00409.813W	17.183306	20.05514	-9.99	-0.032257	0.000017	-0.033524	0.000022	0.001273	0.000021	8.044419	8.041397	13.27722	2.116211	14.04112	-1.506152
25/08/99	14:02:50	L	5021.335N	00409.790W	17.174223	20.053924	-9.99	-0.032257	0.000017	-0.033524	0.000022	0.001273	0.000021	8.044419	8.041397	13.27722	2.116211	14.04112	-1.506152
25/08/99	14:03:00	L	5021.322N	00409.769W	17.15394	20.054892	-9.99	-0.032266	0.000018	-0.033568	0.000022	0.001274	0.000021	8.04457	8.041547	13.278193	2.115967	14.05256	-1.506079
25/08/99	14:03:10	L	5021.309N	00409.746W	17.155062	20.056831	-9.99	-0.032226	0.000018	-0.033568	0.000022	0.001274	0.000021	8.04457	8.041547	13.278193	2.115967	14.05256	-1.506079
25/08/99	14:03:20	L	5021.296N	00409.725W	17.14894	20.056801	-9.99	-0.032181	0.000024	-0.03353	0.000025	0.001349	0.000025	8.044695	8.041676	13.278801	2.120605	14.06457	-1.506189
25/08/99	14:03:30	L	5021.283N	00409.710W	17.143614	20.054644	-9.99	-0.032202	0.000021	-0.033476	0.000025	0.001274	0.000023	8.043213	8.040196	13.277102	2.114258	14.0761	-1.50603
25/08/99	14:03:40	L	5021.270N	00409.691W	17.182932	20.057005	-9.99	-0.032202	0.000021	-0.033476	0.000025	0.001274	0.000023	8.043213	8.040196	13.277102	2.114258	14.0761	-1.50603
25/08/99	14:03:50	L	5021.257N	00409.671W	17.189028	20.054768	-9.99	-0.032226	0.000023	-0.033502	0.000025	0.001276	0.000023	8.043614	8.040592	13.276519	2.12085	14.0881	-1.506067
25/08/99	14:04:00	L	5021.244N	00409.651W	17.159788	20.056631	-9.99	-0.032259	0.000011	-0.033488	0.000022	0.001239	0.000016	8.043376	8.040347	13.278982	2.123901	14.09963	-1.506006
25/08/99	14:04:10	L	5021.231N	00409.629W	17.217646	20.053898	-9.99	-0.032186	0.000025	-0.033484	0.000026	0.001297	0.000026	8.043376	8.040347	13.278982	2.123901	14.09963	-1.506006
25/08/99	14:04:20	L	5021.218N	00409.600W	17.245784	20.056135	-9.99	-0.032102	0.000022	-0.033469	0.000026	0.001297	0.000026	8.043376	8.040347	13.278982	2.123901	14.09963	-1.506006
25/08/99	14:04:30	L	5021.205N	00409.577W	17.218641	20.056135	-9.99	-0.032102	0.000022	-0.033469	0.000026	0.001297	0.000026	8.043376	8.040347	13.278982	2.123901	14.09963	-1.506006
25/08/99	14:04:40	L	5021.192N	00409.554W	17.205576	20.056259	-9.99	-0.032107	0.000021	-0.033465	0.000026	0.001297	0.000026	8.043376	8.040347	13.278982	2.123901	14.09963	-1.506006
25/08/99	14:04:50	L	5021.179N	00409.531W	17.220881	20.054022	-9.99	-0.032147	0.000024	-0.033444	0.000026	0.001354	0.000021	8.04199	8.038951	13.278495	2.124634	14.11168	-1.505981
25/08/99	14:05:00	L	5021.166N	00409.509W	17.228976	20.054022	-9.99	-0.032147	0.000024	-0.033444	0.000026	0.001354	0.000021	8.04199	8.038951	13.278495	2.124634	14.11168	-1.505981
25/08/99	14:05:10	L	5021.153N	00409.486W	17.266666	20.054022	-9.99	-0.032064	0.000026	-0.033451	0.000026	0.001357	0.000023	8.04189	8.038796	13.277119	2.124634	14.11168	-1.505981
25/08/99	14:05:20	L	5021.140N	00409.463W	17.266666	20.054022	-9.99	-0.032064	0.000026	-0.033451	0.000026	0.001357	0.000023	8.04189	8.038796	13.277119	2.124634	14.11168	-1.505981
25/08/99	14:05:30	L	5021.127N	00409.437W	17.283091	20.056757	-9.99	-0.032146	0.000023	-0.033478	0.000024	0.001332	0.000023	8.042743	8.039714	13.27695	2.125366	14.14681	-1.505994
25/08/99	14:05:40	L	5021.114N	00409.409W	17.297026	20.056507	-9.99	-0.032208	0.000023	-0.033497	0.000024	0.001288	0.000022	8.043858	8.04082	13.27817	2.12551	14.15258	-1.506042
25/08/99	14:05:50	L	5021.101N	00409.383W	17.377647	20.057129	-9.99	-0.032303	0.000021	-0.033565	0.000022	0.001262	0.000022	8.045588	8.042527	13.277677	2.125	14.15884	-1.506067

25/08/99	14:05:50	L	5021.551N	00409.353W	17.453541	20.056135	-9.99	-0.03229	0.000025	-0.033597	0.000016	0.001307	0.00002	8.045422	8.043722	13.278168	2.120728	14.15468	-1.506006
25/08/99	14:06:00	L	5021.559N	00409.327W	17.491362	20.059864	-9.99	-0.03283	0.00003	-0.033641	0.000022	0.001258	0.000026	8.047071	8.044019	13.279342	2.137451	14.17038	-1.506116
25/08/99	14:06:10	L	5021.606N	00409.298W	17.473572	20.058123	-9.99	-0.03232	0.000024	-0.033647	0.00002	0.001324	0.000021	8.045997	8.043945	13.278571	2.128906	14.17618	-1.506104
25/08/99	14:06:20	L	5021.612N	00409.265W	17.471207	20.056881	-9.99	-0.032302	0.000024	-0.033655	0.000013	0.001353	0.000019	8.046544	8.042596	13.277957	2.130859	14.18244	-1.506018
25/08/99	14:06:30	L	5021.615N	00409.232W	17.476557	20.057751	-9.99	-0.03233	0.000026	-0.033665	0.000021	0.001336	0.000024	8.046127	8.043087	13.278377	2.129028	14.18827	-1.506018
25/08/99	14:06:40	L	5021.614N	00409.204W	17.502808	20.056757	-9.99	-0.032337	0.000028	-0.033659	0.000017	0.001322	0.000022	8.046281	8.043232	13.277796	2.119995	14.19398	-1.506177
25/08/99	14:06:50	L	5021.613N	00409.171W	17.461137	20.059242	-9.99	-0.032318	0.000024	-0.033662	0.00002	0.001345	0.000022	8.045907	8.042864	13.280171	2.137573	14.19975	-1.506165
25/08/99	14:07:00	L	5021.614N	00409.141W	17.431147	20.057377	-9.99	-0.032381	0.000025	-0.033681	0.000023	0.001364	0.000023	8.047022	8.043978	13.27933	2.126221	14.20605	-1.506091
25/08/99	14:07:10	L	5021.613N	00409.113W	17.494892	20.058123	-9.99	-0.032213	0.000025	-0.033656	0.000013	0.001276	0.000022	8.047022	8.043978	13.27933	2.126221	14.20605	-1.506091
25/08/99	14:07:20	L	5021.616N	00409.082W	17.514004	20.057129	-9.99	-0.032266	0.00002	-0.033656	0.000022	0.001353	0.000022	8.044178	8.041132	13.277417	2.128174	14.21761	-1.506042
25/08/99	14:07:30	L	5021.615N	00409.050W	17.555807	20.057627	-9.99	-0.032213	0.000022	-0.033656	0.000022	0.001358	0.000022	8.045652	8.042602	13.277846	2.128174	14.21761	-1.506152
25/08/99	14:07:40	L	5021.616N	00409.023W	17.514004	20.057129	-9.99	-0.032213	0.000022	-0.033656	0.000022	0.001353	0.000022	8.044178	8.041132	13.277417	2.128174	14.21761	-1.506152
25/08/99	14:07:50	L	5021.617N	00408.993W	17.655581	20.058664	-9.99	-0.032202	0.000023	-0.033656	0.000015	0.001353	0.000015	8.04438	8.041312	13.27948	2.127319	14.22562	-1.506152
25/08/99	14:08:00	L	5021.618N	00408.962W	17.552198	20.058602	-9.99	-0.032218	0.000023	-0.033659	0.000011	0.001363	0.000022	8.04421	8.041371	13.277652	2.134888	14.24134	-1.506067
25/08/99	14:08:10	L	5021.620N	00408.935W	17.518358	20.057503	-9.99	-0.032244	0.000024	-0.033665	0.00002	0.001321	0.000022	8.044677	8.041634	13.276456	2.122314	14.24712	-1.506116
25/08/99	14:08:20	L	5021.621N	00408.906W	17.379285	20.057265	-9.99	-0.032417	0.000024	-0.033659	0.000014	0.001345	0.000016	8.045711	8.042665	13.278119	2.134766	14.25343	-1.506104
25/08/99	14:08:30	L	5021.623N	00408.875W	17.451799	20.058242	-9.99	-0.032307	0.000019	-0.033659	0.000014	0.001242	0.000018	8.048923	8.045877	13.277819	2.130127	14.25928	-1.506067
25/08/99	14:08:40	L	5021.624N	00408.849W	17.494099	20.058668	-9.99	-0.032349	0.000047	-0.033702	0.000017	0.001384	0.000019	8.04415	8.041108	13.279022	2.132446	14.27081	-1.506091
25/08/99	14:08:50	L	5021.625N	00408.816W	17.51189	20.05949	-9.99	-0.032214	0.000022	-0.033659	0.000017	0.001384	0.000019	8.04415	8.041108	13.279022	2.132446	14.27081	-1.506091
25/08/99	14:09:00	L	5021.627N	00408.782W	17.414848	20.05962	-9.99	-0.032505	0.000022	-0.03369	0.000023	0.001185	0.000022	8.049109	8.046065	13.276749	2.134155	14.27712	-1.506128
25/08/99	14:09:10	L	5021.630N	00408.753W	17.415844	20.060112	-9.99	-0.0323	0.00002	-0.033659	0.000016	0.001359	0.000018	8.045547	8.04251	13.276883	2.138672	14.28296	-1.506067
25/08/99	14:09:20	L	5021.633N	00408.719W	17.476059	20.057005	-9.99	-0.032354	0.00003	-0.033636	0.000024	0.001282	0.000027	8.046553	8.043502	13.2759	2.12893	14.28871	-1.505884
25/08/99	14:09:30	L	5021.636N	00408.685W	17.564764	20.061106	-9.99	-0.032192	0.000024	-0.033534	0.000024	0.001341	0.000024	8.043838	8.040776	13.277725	2.136719	14.29449	-1.505908
25/08/99	14:09:40	L	5021.641N	00408.648W	17.499453	20.059614	-9.99	-0.032267	0.00002	-0.033512	0.000018	0.001245	0.000019	8.045058	8.042015	13.277871	2.134277	14.30083	-1.506037
25/08/99	14:09:50	L	5021.645N	00408.616W	17.42704	20.057827	-9.99	-0.03231	0.000021	-0.033504	0.000021	0.001245	0.000021	8.044729	8.041685	13.277534	2.132812	14.30667	-1.505933
25/08/99	14:10:00	L	5021.651N	00408.579W	17.442965	20.05949	-9.99	-0.032251	0.000021	-0.033496	0.000021	0.001245	0.000021	8.045639	8.042591	13.285908	2.124512	14.31822	-1.505945
25/08/99	14:10:10	L	5021.657N	00408.542W	17.466857	20.056757	-9.99	-0.032322	0.000021	-0.033511	0.000019	0.001208	0.000019	8.046233	8.04318	13.27847	2.1427	14.32452	-1.505969
25/08/99	14:10:20	L	5021.661N	00408.509W	17.539757	20.061106	-9.99	-0.032332	0.000024	-0.033506	0.000013	0.001174	0.000013	8.043943	8.04089	13.279337	2.13269	14.33612	-1.505994
25/08/99	14:10:30	L	5021.665N	00408.471W	17.583502	20.058249	-9.99	-0.032197	0.000026	-0.033438	0.000023	0.001241	0.000023	8.043943	8.04089	13.279337	2.13269	14.33612	-1.505994
25/08/99	14:10:40	L	5021.673N	00408.433W	17.531672	20.058994	-9.99	-0.032119	0.000021	-0.033419	0.000021	0.001241	0.000021	8.043943	8.04089	13.279337	2.13269	14.33612	-1.505994
25/08/99	14:10:50	L	5021.680N	00408.399W	17.495462	20.059566	-9.99	-0.032075	0.000021	-0.033408	0.000015	0.001289	0.000017	8.042525	8.03948	13.276659	2.1427	14.32452	-1.505945
25/08/99	14:11:00	L	5021.685N	00408.361W	17.440353	20.057827	-9.99	-0.032064	0.000025	-0.033438	0.000024	0.001344	0.000024	8.042068	8.03908	13.276659	2.1427	14.32452	-1.505945
25/08/99	14:11:10	L	5021.692N	00408.322W	17.470585	20.059242	-9.99	-0.03213	0.000025	-0.033452	0.000021	0.001347	0.000021	8.042547	8.039508	13.277841	2.140747	14.35413	-1.506152
25/08/99	14:11:20	L	5021.697N	00408.288W	17.470585	20.059242	-9.99	-0.03216	0.000025	-0.033452	0.000021	0.001347	0.000021	8.042547	8.039508	13.277841	2.140747	14.35413	-1.506152
25/08/99	14:11:30	L	5021.703N	00408.248W	17.555931	20.060486	-9.99	-0.032214	0.00002	-0.033468	0.000019	0.001284	0.00002	8.044204	8.041149	13.275392	2.13916	14.35988	-1.506104
25/08/99	14:11:40	L	5021.709N	00408.208W	17.605072	20.060734	-9.99	-0.03214	0.000026	-0.033455	0.000014	0.001315	0.00002	8.042974	8.039913	13.277204	2.138062	14.37203	-1.505981
25/08/99	14:11:50	L	5021.715N	00408.173W	17.617886	20.061356	-9.99	-0.032151	0.000021	-0.033462	0.000017	0.001311	0.000019	8.043176	8.040115	13.27855	2.143433	14.37793	-1.505945
25/08/99	14:12:00	L	5021.721N	00408.136W	17.608183	20.060734	-9.99	-0.03212	0.000022	-0.033476	0.000024	0.001356	0.000023	8.042628	8.039569	13.277941	2.145752	14.38366	-1.506055
25/08/99	14:12:10	L	5021.729N	00408.100W	17.585789	20.063593	-9.99	-0.032069	0.000018	-0.03347	0.000022	0.001401	0.00002	8.041719	8.038664	13.286778	2.154419	14.39947	-1.506055

25/08/99	14:12:20	L	5021.738N	00408.071W	17.506889	20.070533	-9.99	-0.032209	0.000022	-0.033709	0.000017	0.0015	0.00002	8.044161	8.04111	13.271299	2.200806	14.39589	-1.506201
25/08/99	14:12:30	L	5021.748N	00408.037W	17.791428	20.059864	-9.99	-0.031704	0.000023	-0.033508	0.000019	0.001805	0.000021	8.035609	8.032535	13.280579	2.144043	14.4019	-1.506189
25/08/99	14:12:40	L	5021.763N	00408.007W	17.791056	20.061977	-9.99	-0.031445	0.000025	-0.032965	0.000012	0.00152	0.000019	8.031113	8.029048	13.277196	2.14917	14.40785	-1.505994
25/08/99	14:12:50	L	5021.778N	00407.982W	17.725496	20.06036	-9.99	-0.031413	0.000023	-0.032828	0.000021	0.001415	0.000022	8.030499	8.027429	13.278556	2.148682	14.41347	-1.505994
25/08/99	14:13:00	L	5021.798N	00407.963W	17.641999	20.061106	-9.99	-0.031575	0.000021	-0.032852	0.000022	0.001276	0.000022	8.032322	8.030155	13.278232	2.143311	14.41981	-1.50603
25/08/99	14:13:10	L	5021.818N	00407.955W	17.691658	20.060982	-9.99	-0.03167	0.000016	-0.033208	0.000015	0.001539	0.000016	8.03491	8.03185	13.275376	2.140503	14.42567	-1.506128
25/08/99	14:13:20	L	5021.833N	00407.951W	17.71629	20.062101	-9.99	-0.031245	0.000023	-0.03287	0.000019	0.001625	0.000021	8.027567	8.02451	13.278077	2.149536	14.43144	-1.506189
25/08/99	14:13:30	L	5021.871N	00407.948W	17.558907	20.061728	-9.99	-0.031139	0.000016	-0.032728	0.000023	0.001487	0.00002	8.025317	8.02227	13.277488	2.144287	14.43727	-1.506128
25/08/99	14:13:40	L	5021.887N	00407.945W	17.618757	20.059614	-9.99	-0.030716	0.000027	-0.032332	0.000022	0.001616	0.000024	8.018304	8.015244	13.276591	2.133057	14.44364	-1.506091
25/08/99	14:14:00	L	5021.904N	00407.946W	17.726864	20.063219	-9.99	-0.030599	0.000022	-0.032263	0.000023	0.001663	0.000022	8.016395	8.013327	13.279088	2.151123	14.45532	-1.505994
25/08/99	14:14:10	L	5021.909N	00407.947W	17.757965	20.060753	-9.99	-0.03076	0.000026	-0.031726	0.000021	0.001786	0.000022	8.01011	8.007036	13.278011	2.145386	14.46117	-1.505533
25/08/99	14:14:20	L	5021.909N	00407.947W	17.754606	20.060868	-9.99	-0.03076	0.000026	-0.031726	0.000021	0.001786	0.000022	8.01011	8.007036	13.278011	2.145386	14.46117	-1.505533
25/08/99	14:14:30	L	5021.912N	00407.948W	17.818796	20.063343	-9.99	-0.030098	0.000013	-0.031635	0.000017	0.001537	0.000015	8.007811	8.004744	13.278069	2.146362	14.47343	-1.505884
25/08/99	14:14:40	L	5021.915N	00407.950W	17.844049	20.062723	-9.99	-0.030105	0.00002	-0.031487	0.000018	0.001392	0.000019	8.007998	8.004892	13.277409	2.148437	14.47915	-1.505994
25/08/99	14:14:50	L	5021.922N	00407.950W	17.813074	20.063043	-9.99	-0.030233	0.000021	-0.031775	0.000016	0.001455	0.000018	8.010155	8.007077	13.276827	2.148804	14.48503	-1.506006
25/08/99	14:15:00	L	5021.932N	00407.952W	17.871914	20.062101	-9.99	-0.030233	0.000021	-0.031775	0.000016	0.001455	0.000018	8.010155	8.007077	13.276827	2.148804	14.48503	-1.506006
25/08/99	14:15:10	L	5021.947N	00407.959W	17.956629	20.063043	-9.99	-0.030284	0.000021	-0.031637	0.000015	0.001552	0.000018	8.011199	8.008126	13.277969	2.153199	14.49132	-1.506018
25/08/99	14:15:20	L	5021.962N	00407.960W	17.966703	20.061852	-9.99	-0.030762	0.00002	-0.031624	0.000022	0.000985	0.000021	8.01734	8.014249	13.278673	2.15564	14.49722	-1.506189
25/08/99	14:15:30	L	5021.978N	00407.963W	17.867311	20.063841	-9.99	-0.030638	0.000021	-0.031742	0.000016	0.000998	0.000021	8.018376	8.016295	13.277435	2.153442	14.50885	-1.506189
25/08/99	14:15:40	L	5021.991N	00407.963W	17.829992	20.062349	-9.99	-0.03044	0.000015	-0.031893	0.000021	0.001293	0.000018	8.014563	8.011406	13.279657	2.160899	14.52887	-1.506189
25/08/99	14:15:50	L	5022.008N	00407.965W	17.748884	20.063841	-9.99	-0.030492	0.000017	-0.031752	0.000023	0.00126	0.00002	8.014563	8.011406	13.279657	2.160899	14.52887	-1.506189
25/08/99	14:16:00	L	5022.023N	00407.963W	17.656078	20.061356	-9.99	-0.030535	0.000023	-0.031714	0.000025	0.001179	0.000024	8.015201	8.012145	13.278832	2.146729	14.52687	-1.506128
25/08/99	14:16:10	L	5022.038N	00407.954W	17.492979	20.064587	-9.99	-0.031132	0.000016	-0.032082	0.000016	0.00095	0.000016	8.025377	8.022329	13.278311	2.164917	14.53316	-1.50614
25/08/99	14:16:20	L	5022.044N	00407.944W	17.420944	20.06148	-9.99	-0.03132	0.000023	-0.032512	0.000014	0.001197	0.000021	8.028247	8.02517	13.279608	2.150391	14.54489	-1.506079
25/08/99	14:16:30	L	5022.064N	00407.937W	17.417833	20.063469	-9.99	-0.031298	0.000025	-0.032612	0.00002	0.001313	0.000022	8.028247	8.02517	13.279608	2.150391	14.54489	-1.506079
25/08/99	14:16:40	L	5022.076N	00407.933W	17.417833	20.063469	-9.99	-0.031298	0.000025	-0.032612	0.00002	0.001313	0.000022	8.028247	8.02517	13.279608	2.150391	14.54489	-1.506079
25/08/99	14:16:50	L	5022.083N	00407.933W	17.53727	20.06148	-9.99	-0.031759	0.000022	-0.032912	0.000019	0.001153	0.00002	8.036301	8.033243	13.277061	2.154785	14.55711	-1.506116
25/08/99	14:17:00	L	5022.109N	00407.935W	17.564142	20.064215	-9.99	-0.031789	0.000021	-0.033008	0.000019	0.001153	0.00002	8.036301	8.033243	13.277061	2.154785	14.55711	-1.506116
25/08/99	14:17:10	L	5022.119N	00407.937W	17.501314	20.060112	-9.99	-0.031793	0.000022	-0.032912	0.000019	0.001153	0.00002	8.036301	8.033243	13.277061	2.154785	14.55711	-1.506116
25/08/99	14:17:20	L	5022.133N	00407.942W	17.966082	20.065706	-9.99	-0.032417	0.000022	-0.033116	0.000018	0.001323	0.000022	8.036852	8.033798	13.277539	2.153442	14.56885	-1.506067
25/08/99	14:17:30	L	5022.142N	00407.952W	17.871416	20.062473	-9.99	-0.031684	0.000022	-0.033259	0.000019	0.001338	0.000022	8.048122	8.045046	13.276811	2.154297	14.5748	-1.506018
25/08/99	14:17:40	L	5022.142N	00407.968W	17.94593	20.064339	-9.99	-0.031684	0.000022	-0.033259	0.000019	0.001338	0.000022	8.048122	8.045046	13.276811	2.154297	14.5748	-1.506018
25/08/99	14:17:50	L	5022.140N	00407.965W	18.061117	20.063469	-9.99	-0.031541	0.000025	-0.033047	0.000024	0.001313	0.000024	8.035943	8.032865	13.276011	2.154663	14.58113	-1.506152
25/08/99	14:18:00	L	5022.141N	00407.997W	17.871416	20.063343	-9.99	-0.031734	0.000021	-0.033034	0.000024	0.001484	0.000024	8.033055	8.029973	13.276153	2.159546	14.58705	-1.506238
25/08/99	14:18:10	L	5022.141N	00408.010W	17.752989	20.062101	-9.99	-0.031332	0.000022	-0.032771	0.000018	0.001439	0.000023	8.025802	8.022828	13.277721	2.15271	14.59876	-1.506091
25/08/99	14:18:20	L	5022.142N	00408.022W	17.709696	20.062349	-9.99	-0.030888	0.00002	-0.032703	0.000024	0.001418	0.000022	8.025802	8.022828	13.277669	2.151978	14.60461	-1.506079
25/08/99	14:18:30	L	5022.143N	00408.031W	17.697878	20.060112	-9.99	-0.031285	0.000022	-0.032771	0.000018	0.001439	0.000023	8.025802	8.022828	13.277669	2.151978	14.60461	-1.506079
25/08/99	14:18:40	L	5022.144N	00408.038W	17.61577	20.06036	-9.99	-0.031144	0.000024	-0.032511	0.000023	0.001366	0.000023	8.025722	8.022659	13.276638	2.149292	14.62852	-1.506226
25/08/99	14:18:50	L	5022.146N	00408.043W	17.545481	20.060486	-9.99	-0.031125	0.000019	-0.032605	0.000023	0.00148	0.000021	8.025314	8.02226	13.277283	2.145752	14.62852	-1.506091
25/08/99	14:19:00	L	5022.148N	00408.044W	17.506912	20.061604	-9.99	-0.030832	0.000018	-0.032431	0.000017	0.001499	0.000018	8.021932	8.018875	13.279127	2.149658	14.6348	-1.506042
25/08/99	14:19:10	L	5022.151N	00408.044W	17.576334	20.063095	-9.99	-0.030867	0.000025	-0.032042	0.00002	0.001675	0.000023	8.02197	8.018815	13.278419	2.151855	14.64649	-1.505933
25/08/99	14:19:20	L	5022.154N	00408.044W	17.699247	20.063219	-9.99	-0.029638	0.000024	-0.031383	0.000019	0.001745	0.000021	7.999719	7.996647	13.27921	2.148315	14.64649	-1.506201