EMBEDDED TECHNOLOGY SOLUTIONS

SILENT HERDSMAN®
USER GUIDE

Version 2.7

1. Table of Contents

1. Table of Contents 3
2. About this Guide 5
3. Introduction 7
4. Installation 8
   4.1. Overview 8
   4.2. Silent Herdsman® Management Computer 8
   4.3. Management Computer Installation 11
   4.4. Data Gathering Base Station 11
5. Silent Herdsman® Collar 12
   5.1. Standard assembly 12
   5.2. Collar sensor 12
   5.3. Buckle 13
   5.4. Weight 13
6. Silent Herdsman® Management Computer 14
   6.1. Start up 14
   6.2. Overview 15
   6.3. On Screen Keyboard 18
7. Activity Monitoring 20
   7.1. Overview 20
   7.2. Oestrus Prediction 20
   7.3. Oestrus Detection Threshold 23
   7.4. Future Oestrus Events 23
   7.5. Calving Date Indicator 25
   7.6. Changing Time Period on Activity Graphs 26
8. Alerts 28
   8.1. Overview 28
   8.2. Multiple Alerts 30
   8.3. System Alerts 30
   8.4. Alert Beacon 30
   8.5. Alerts and Activity 31
   8.6. Annotations 33
   8.7. Email Alerts 35
9. Collars 36
   9.1. Introduction 36

9.2. Attaching collars to cows 37
9.3. Detaching Collars from Cows 38
9.4. Finding Collars 40
9.5. Deleting Collar 40
9.6. Saving List of Attached Cows 41
10. Cow Information Table 42
10.1. Overview 42
10.2. Importing Herd Information 43
10.3. Cow Groups 44
11. Settings 45
11.1. Overview 45
11.2. Activity Display 45
11.3. System Settings 46
11.4. Group Settings 47
11.5. Data Exchange 48
11.6. Data Backup 51
11.7. Reports 51
12. System Functions 54
12.1. Online User Guide 54
12.2. System Power Down 54
12.3. Manual Starting of Silent Herdsman 55
Appendix A - Base Stations 56
Appendix B – InterHerd Export Events 58
Appendix C - Collar Upgrade 60
Introduction 60
Upgrading Collars 61
Appendix D - Regulatory Information 65
Declaration of Conformance 65
Waste Electric and Electronic Equipment 67

2. About this Guide

Related Documents

- GOT-5120T-830 Series User Manual

Abbreviations

- ETS Embedded Technology Solutions
- SHM Silent Herdsman

Typographical Conventions

The following typographical conventions are used in this manual:

Red text indicates a cross-reference to information within the document set you are currently reading. Click the red text to go to the referenced item

Blue underlined text indicates a link to a Web page. Click blue-underlined text to browse the specified Web site.

Italics denotes the following items:

- References to other documents:
- Emphasis in text:

Information, provide addition information to help in better use of system.

Critical warning, high lights actions that could cause damage to the system.

Warning, high lights non critical actions to avoid.

Online Resources

Website addresses in this document are listed without http:// in front of the address because most current web browsers do not require it. If you use an older web browser, you may have to add http:// in front of the web address.

See http://www.embeddedtech.co.uk for further information.

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3. Introduction

The Silent Herdsman® system is a new generation of technology that improves significantly the capabilities of automated detection and reporting of the oestrus cycle for cows.

The system monitors the herd around the clock to ensure that no oestrus events are missed and the optimal time for fertilization is alerted to achieve maximum efficiency of the herd for milk production.

Data collection and alerting has been designed to fit in with the normal working routine of the farm by accessing data on the cow while it is in the milking or holding areas. Therefore no additional time is required within the parlour and alerts are produced by the management computer when a cow requires attention.

4. Installation

4.1. Overview

The Silent Herdsman system consists of the following equipment

- Silent Herdsman® Management Computer
- Network router
- Silent Herdsman® Data Gathering Basestation
- Silent Herdsman® Collar

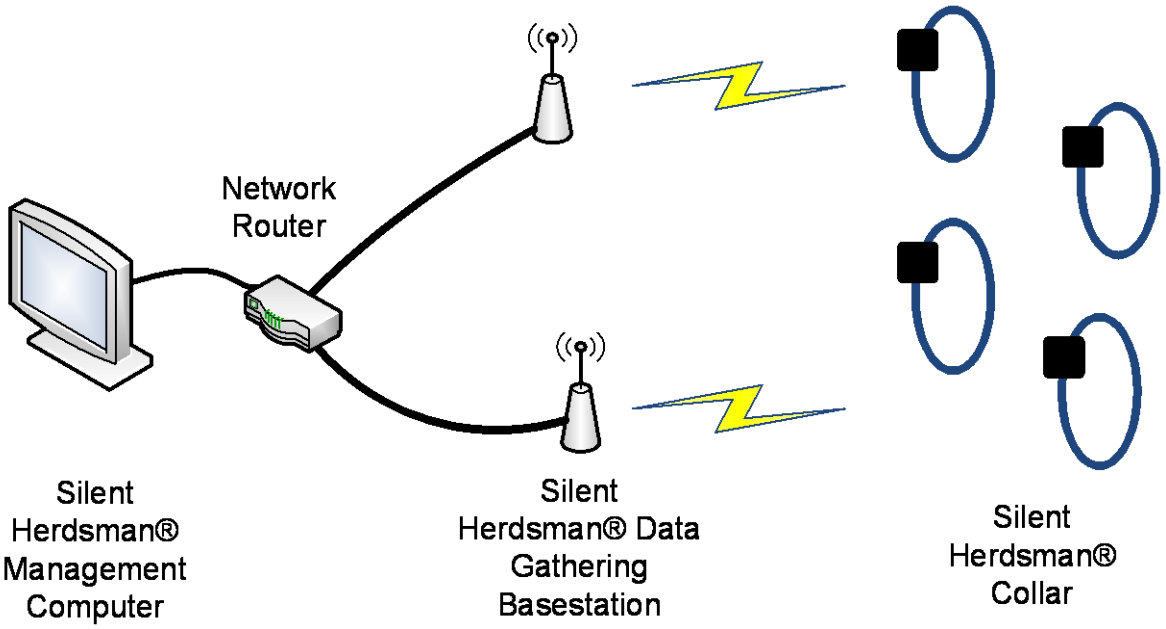


Figure 1 – Silent Herdsman® System Overview

4.2. Silent Herdsman® Management Computer

The management computer is designed with a rugged protection, plastic front bezel with a NEMA4 (IP65) grade of protection. To improve reliability no fans are used for cooling and heat is removed by air vents and conducted through the case.

Desktop or Wall Mounted Screen

The management computer has air vents at the rear, therefore liquids or spray must be kept away from the rear of the computer unit.

No liquids or spray should enter the rear of the computer

Figure 2 - Silent Herdsman® Management Computer

However the front of the Management Computer is IP65 rated which guarantees waterproof and dustproof protection when using the screen, ensuring reliable operation when using the touch screen.

Figure 3 illustrates the location of the I/O on the management computer

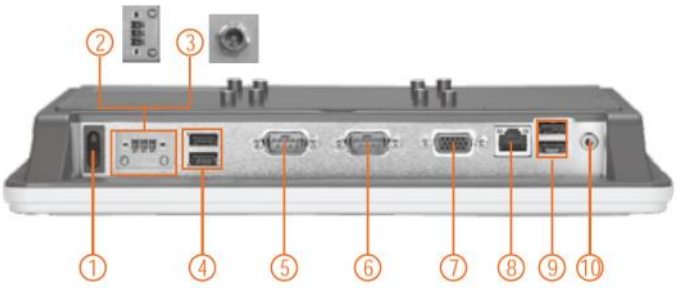


Figure 3 – I/O locations on Silent Herdsman® Management Computer

Wall Mounted Enclosure

For harsher environments, the Silent Herdsman is available with the PC mounted in a IP65 enclosure to provide all round protection to dust and moisture.

Figure 4 - Silent Herdsman® Wall mounted enclosure

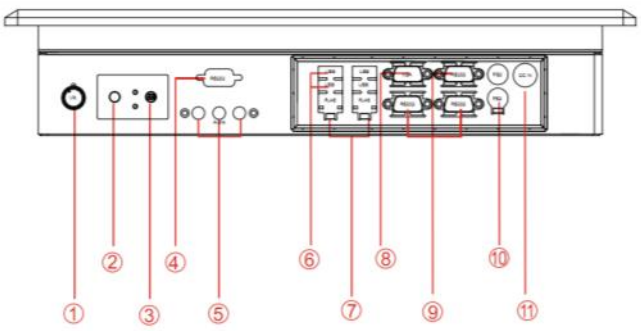


Figure 5 - I/O locations on Silent Herdsman® Management Computer (Enclosure)

Note that the wall mounted enclosure has two USB connectors available at the front. These can be used to connect a keyboard/mouse or USB Drive.

4.3. Management Computer Installation

The management computer will be mounted to a secure fixing such as a wall near a power outlet or on a desk stand.

In typical installations, only two connections will be made. These connections are the supply from the mains power socket and the second connection is the network connection which is connected to the network router that communications with the base stations.

The touch screen will be used for both data display and data input.

'1 Power switch' must be pressed to power up computer after power outage.

4.4. Data Gathering Base Station

The data gathering base stations provide a wireless connection between the management computer and the collars attached to the cows being monitored. This enables the data to be collected from the cows automatically without human intervention and ensures no delays during the milking process.

In order for the base stations to have an opportunity to retrieve the data stored in the cow's collar, the cow must be within 30 meters of a base station for at least 20 mins a day.

The ideal location for base stations is above the cow at approximately 3.5 meters, e.g. on the parlour roof or in an area where the herd congregates such as the holding pen.

5. Silent Herdsman® Collar

5.1. Standard assembly

The collar attached to the cow comprises of 4 different components;

1. Sensor
2. Strap
3. Buckle
4. Weight

5.2. Collar sensor

Figure 6 illustrates how the strap is attached to the collar sensor by running the strap through the two openings of the collar sensor.

The uncovered side of the sensor box placed facing away from the cow's neck. Also the unique number for the sensor box is visible on this front side of the box and on the back side of the box underneath the strap.

Figure 6 – Strap position on Collar Sensor

To ensure maximum performance of the Silent Herdsman, the collar sensor must be placed on the upper part of the neck as illustrated in Figure 7

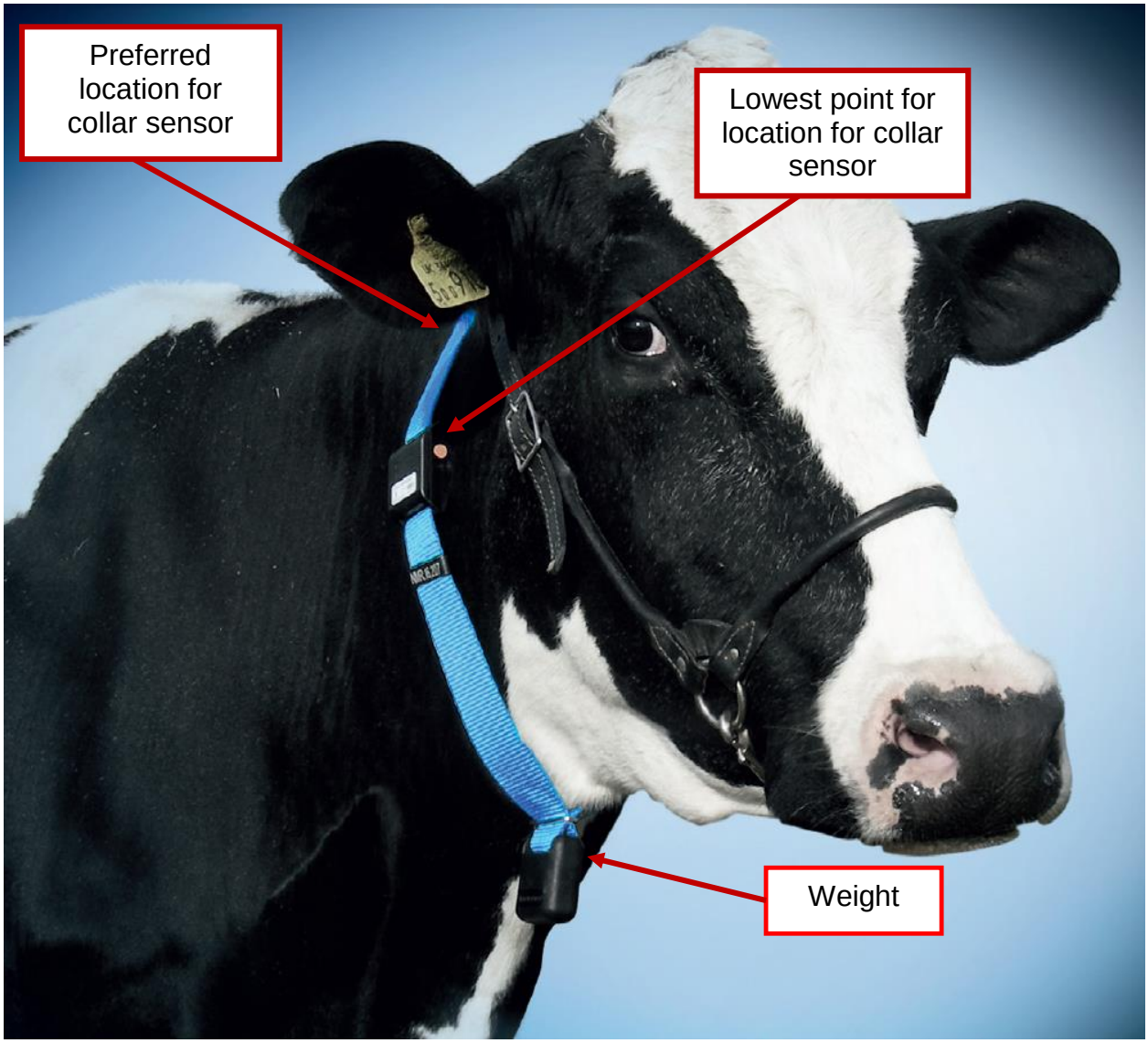


Figure 7 – Location for collar sensor on neck

5.3. Buckle

The buckle is used to adjust the length of the collar to ensure that it fits neatly and comfortably around the neck.

5.4. Weight

The strap is passed through the opening on the weight before the buckle is secured. The weight ensures that the collar sensor remains in the optimum location on the neck, see Figure 7.

6. Silent Herdsman® Management Computer

6.1. Start up

When the Silent Herdsman management computer is turned on, it will automatically launch the monitoring software with a screen similar to Figure 8.

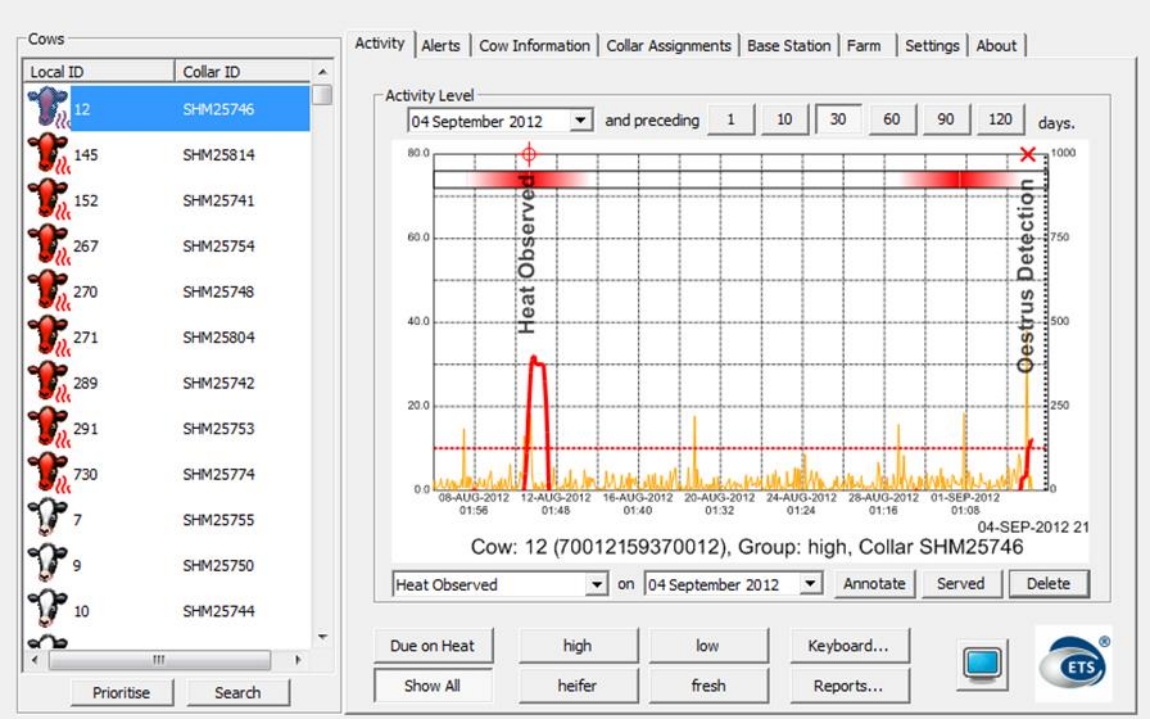


Figure 8 – Opening Screen of Silent Herdsman Software

If the software does not start up automatically or the Silent Herdsman management software has been shutdown, it can be restarted by double clicking the Silent Herdsman icon in the Windows ‘Start’ menu or from the desktop as shown in Figure 9.

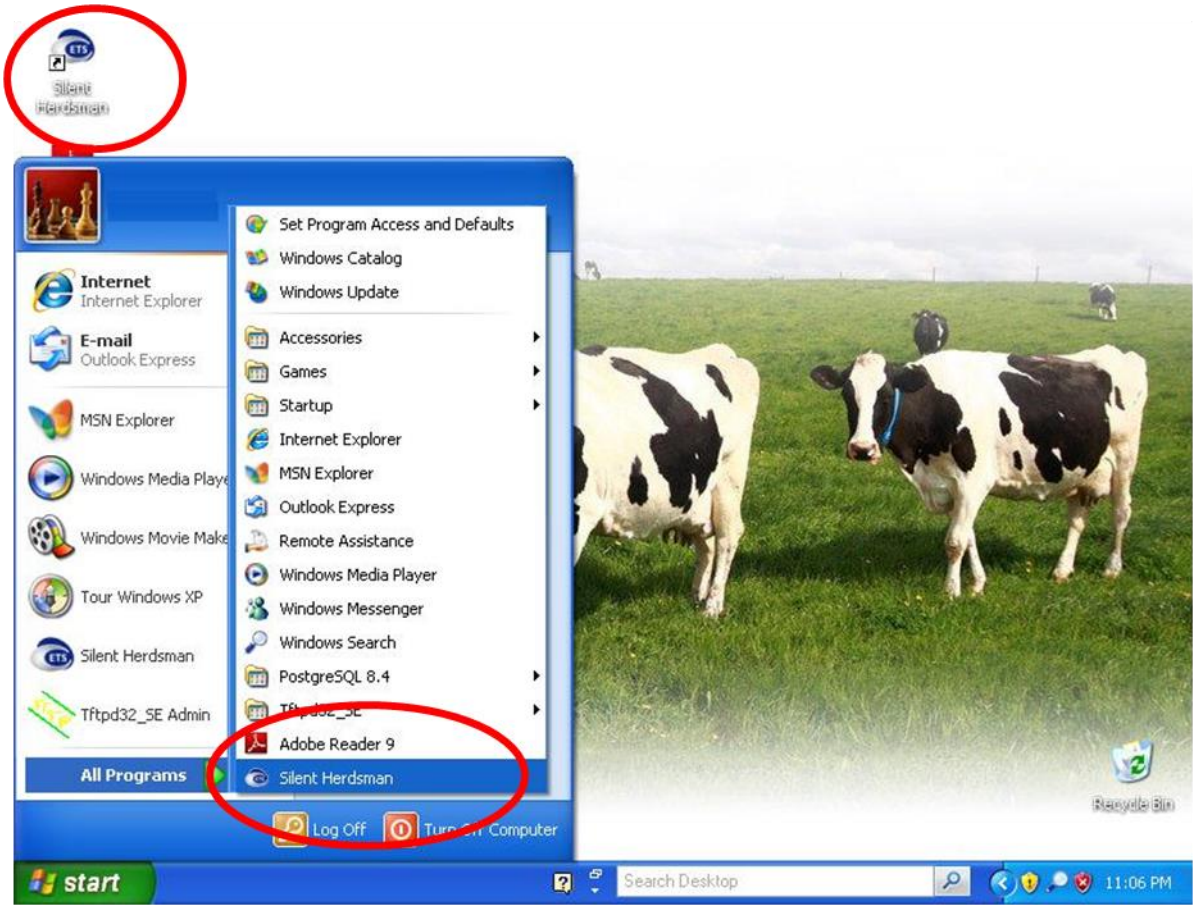


Figure 9 – Silent Herdsman icon to double click to start system

6.2. Overview

The Silent Herdsman application is organised with the cow and collar information displayed on the left hand side and the operational information on the cows accessed through a series of Tabs along the top as indicated in Figure 10.

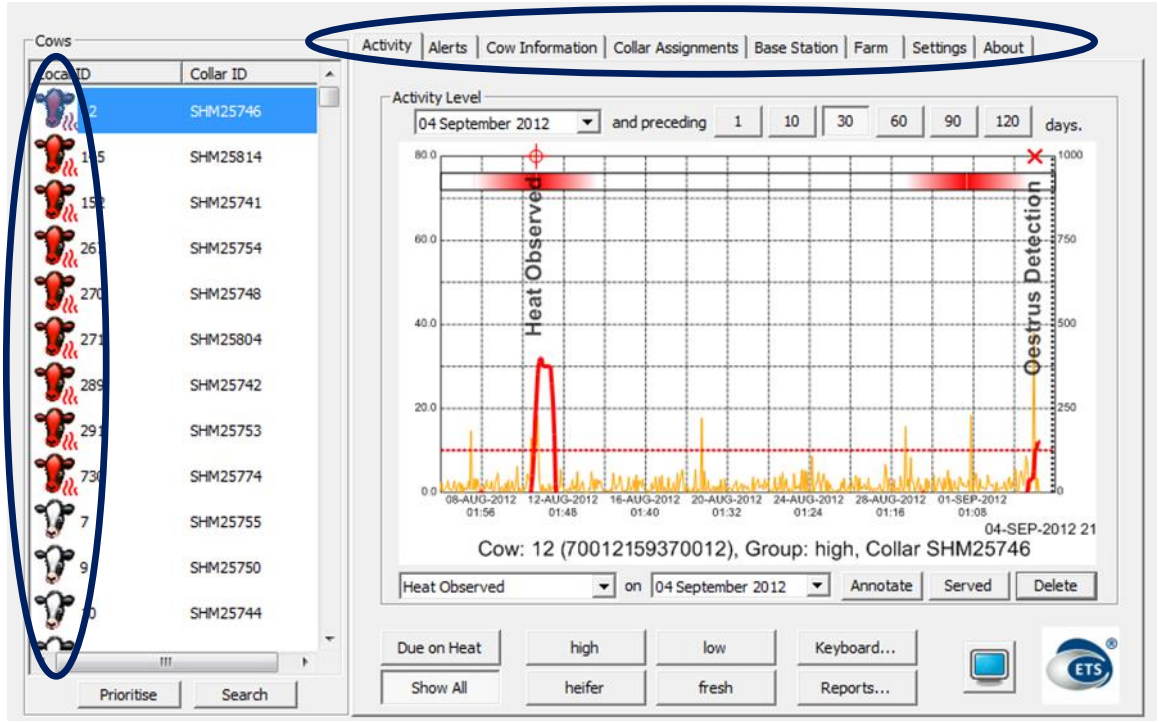


Figure 10: Silent Herdsman application user interface

The cow information can be ordered according to either the “Local ID” or the “Collar ID” by selecting the appropriate title at the top of the column in the cow list.

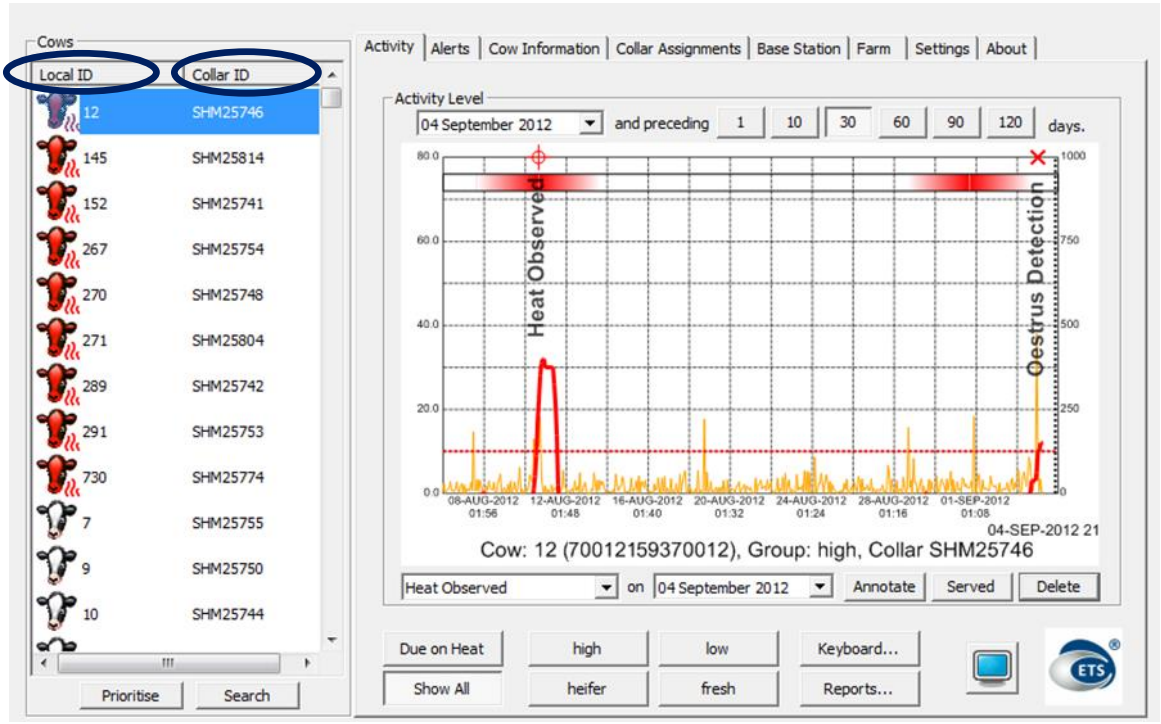


Figure 11: Silent Herdsman application – sorting cow list

Operational features that are significant such as cows in oestrus (shown red in the above image) or a malfunctioning collar are sorted to the top of the cow table by pressing the "**Prioritise**" key.

To select a cow for detailed information, click on the respective **icon** for the cow number which will then be highlighted as shown below in Figure 12. The Cow ID, Group and the Collar ID will also be displayed in the activity window.

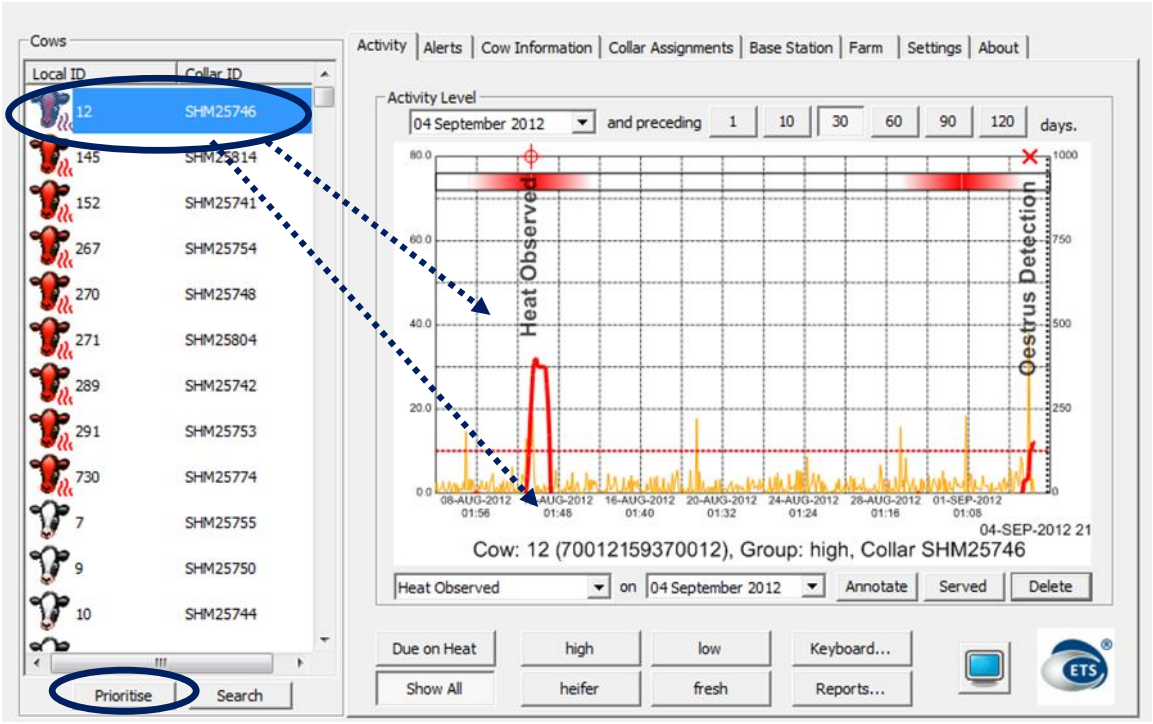


Figure 12: Click on any cow to access information

The icons on the left hand side of the display provide a visual cue of important alerts within the Silent Herdsman system, the meaning of each of these icons is given in Table 1.

	Normal Cow with no pending alerts
	Oestrus Detected
	Collar working normally
	Collar Error

Table 1 – Icons used in Silent Herdsman Software

6.3. On Screen Keyboard

By default the Silent Herdsman system is provided as a touch screen with no physical keyboard or mouse attached. In order to enter text into the system a virtual keyboard is provided.

The virtual keyboard will appear automatically when input is required from the user, however it can also be forced to appear by pressing the keyboard button as illustrated in Figure 13

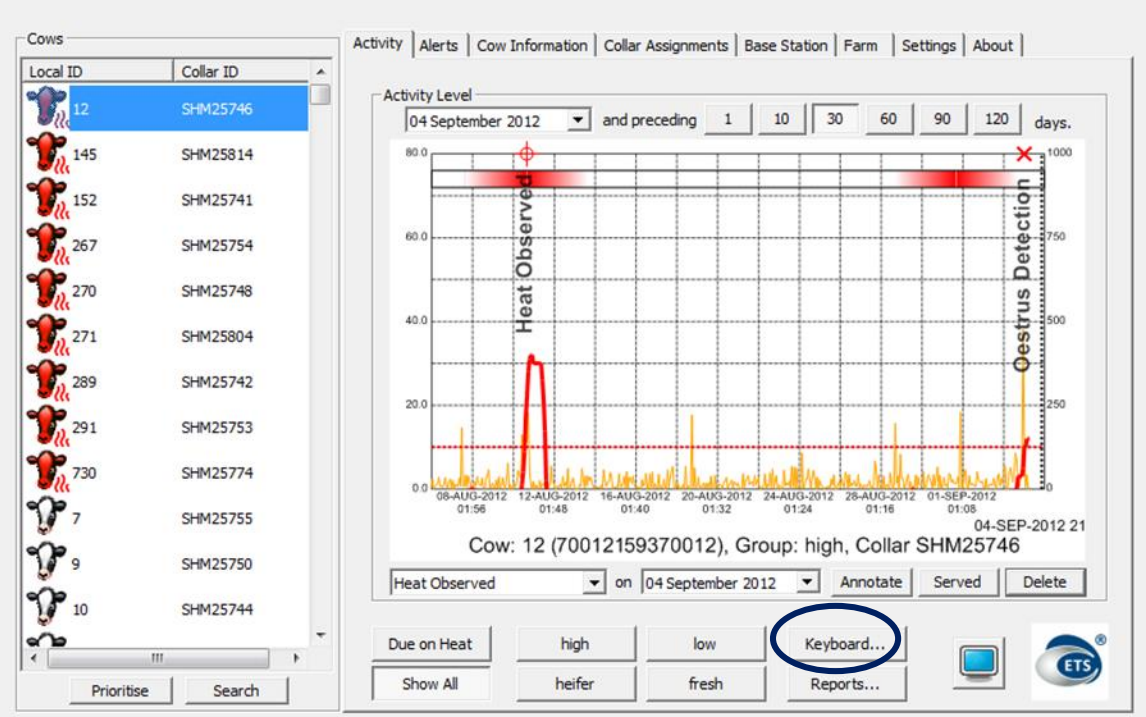


Figure 13: Location of keyboard icon

When the keyboard button is pressed the keyboard appears as shown in Figure 14 (unless the “Physical keyboard” option is set in the settings tab, see section 11.3 on page 46).

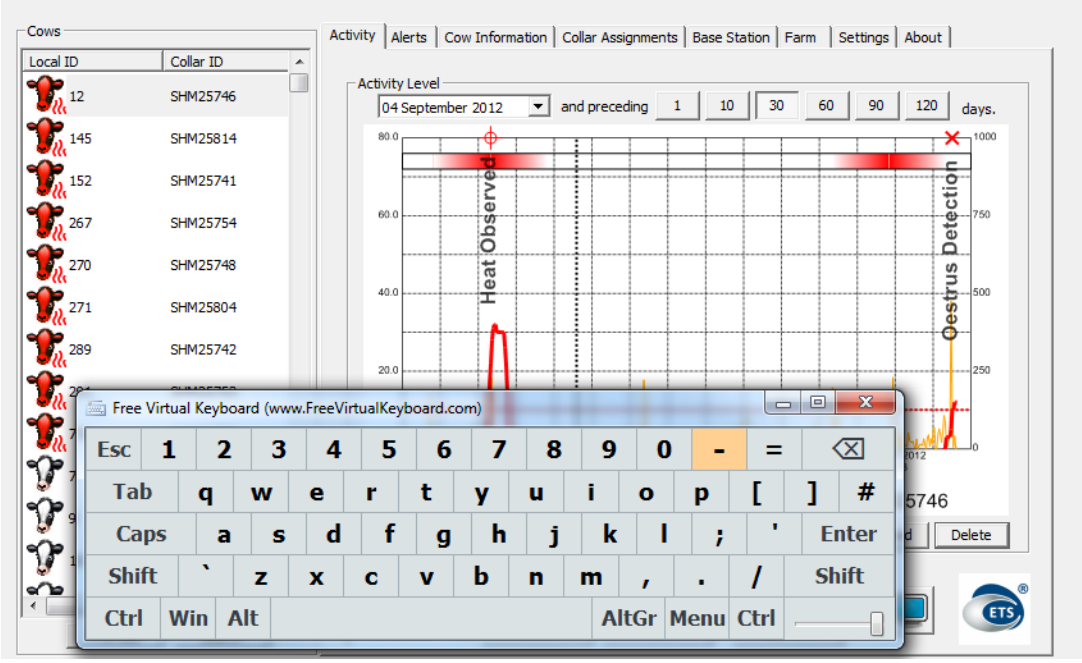


Figure 14: Virtual Keyboard

7. Activity Monitoring

7.1. Overview

The main display for reviewing the behaviour and history of a cow is shown after selecting the 'Activity' tab. This display is shown in Figure 15 with the primary information provided using a time line plot. The collar monitors the cows throughout the day and when in range of a base station the data is analysed and uploaded by the herd monitoring software which is then displayed in the Activity tab.

When the cow is selected from the list of cow Local IDs on the left, the associated activity information is displayed in the graph area as shown in Figure 15. Details of the cow selected is shown below the graph, which displays the cow's Local ID, Herd ID, Group and Collar number, this is highlighted in the Figure 15.

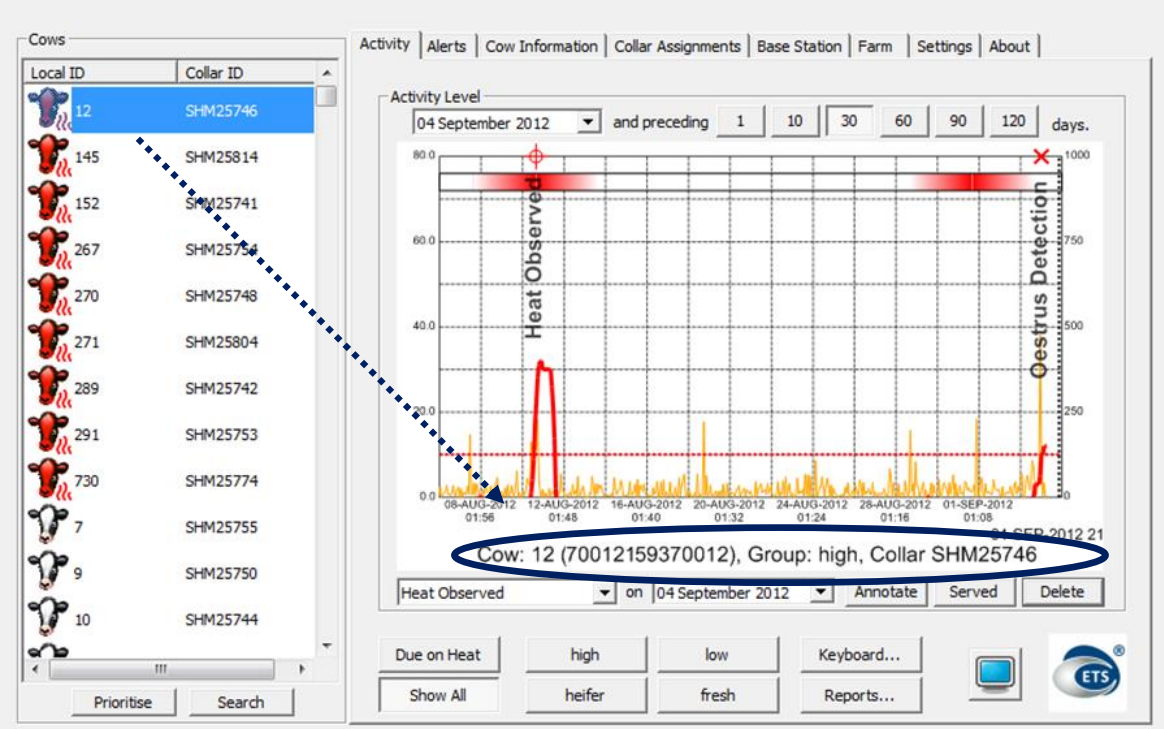


Figure 15 – Display of cow activity

For more information on annotating the activity plot see section 8.6 'Annotations' on page 33.

7.2. Oestrus Prediction

The activity plot displays two types of graphs.

1. Yellow activity graph - provides information on the general activity of the cow.
2. Red Oestrus indication graph - analysed data representing the likelihood of cow being in oestrus.

The higher the value of the peak of the red, oestrus indication graph, then the higher the likelihood the cow is in oestrus. When this red graph exceeds the sensitivity threshold an alert is generated and an 'Oestrus Detected' annotation will automatically be generated and placed on the graph.

The yellow graph provides additional information on the cow and reflects the general activity of the cow. By observing the yellow activity graph this can be used to verify an oestrus detection as an increase in general activity is typically observed.

In many instances the activity level, yellow graph, may be seen to exhibit a sizeable spike and will be dependent on the general operations of the farm. For example it is common to see a spike in the activity graph at milking times. However, if this is not associated with a red oestrus indication graph then the cow is unlikely to be in oestrus.

Figure 16 highlights the two examples of oestrus detections where the large red, oestrus indication graphs and a coincident large yellow, activity graph can be observed.

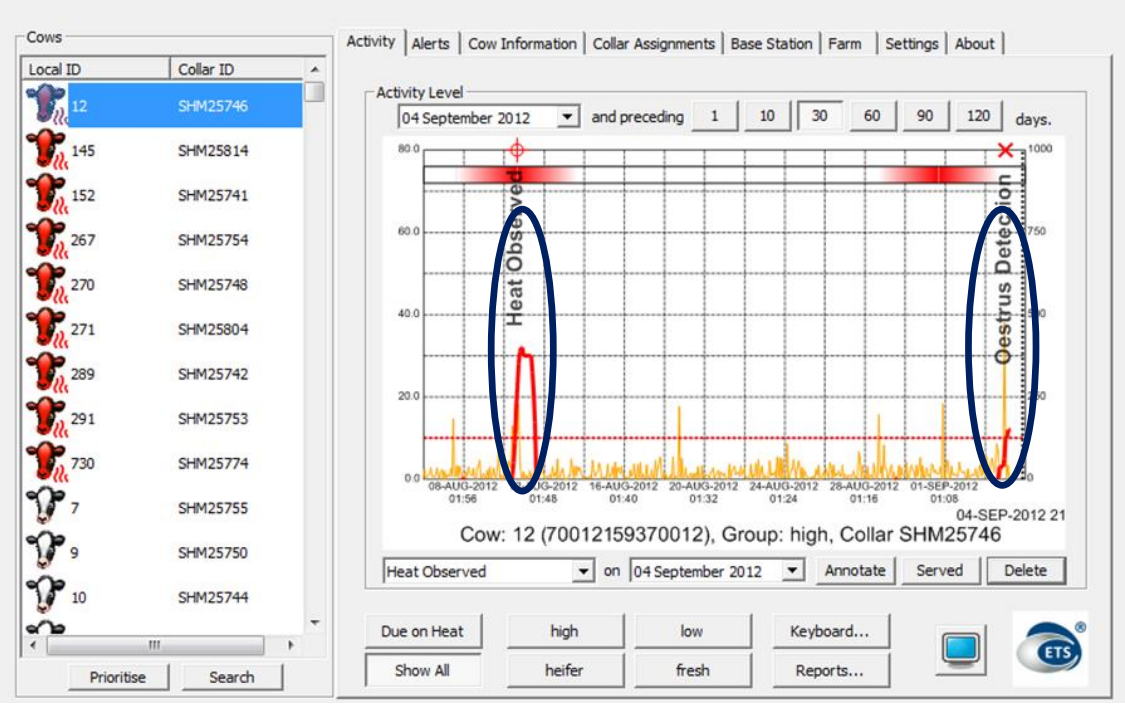


Figure 16 – Activity and Oestrus detection plots

It should be noted that small 'spikes' may appear on the red graph; these typically indicate a change of environment for the cow. These spikes are commonly seen when the collar is first attached to a cow. Figure 17 illustrates an example of where a collar has been removed from a cow for a period of time (this is observed where the yellow graph is not visible) and then a collar has been added. For the initial 72 hours after the collar has been placed on a cow the red oestrus indicator graph shows spikes as the collar 'tunes' to the activity of the cow, these can been ignored.

The Silent Herdsman collar uses the first 72 hours after been attached to a cow to understand 'normal' behaviour for that particular cow. Any alerts and high red oestrus indicator graphs during this period should be ignored.

The Silent Herdsman collar will also generate these spikes when significant changes to animal behaviour are observed, i.e. moving from being housed over winter to grass.

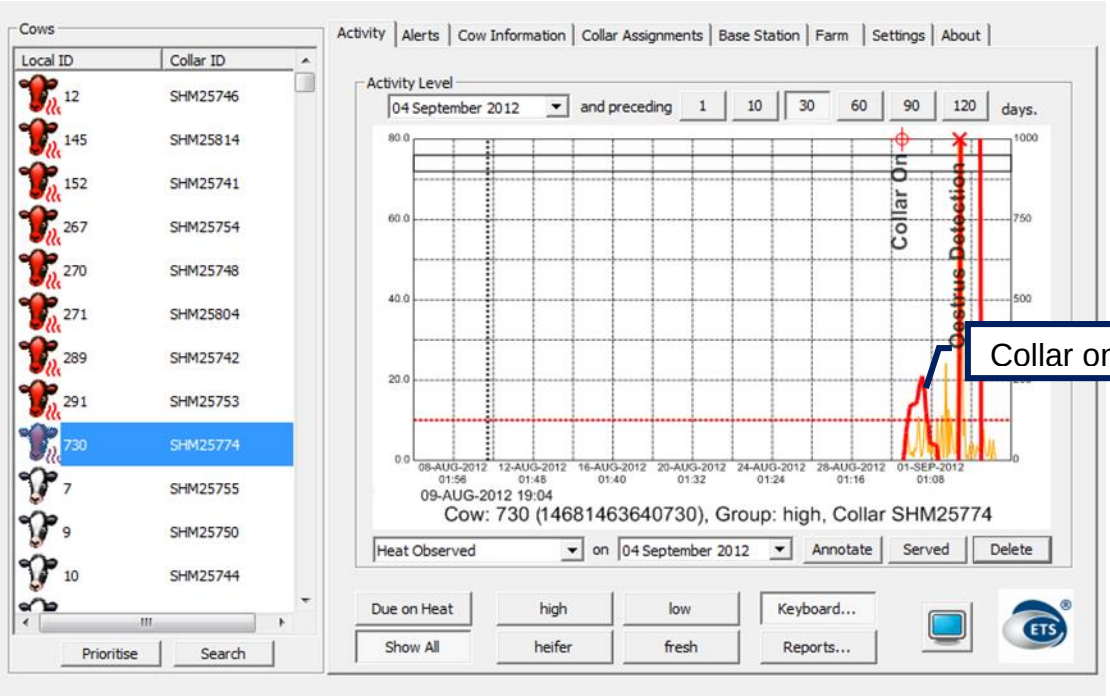


Figure 17 – Illustration of new collar attachment

The Silent Herdsman system flags an alert when the oestrus prediction (red graph) crosses a threshold. The threshold for the herd is shown as a red dashed line, see Figure 18.

When the threshold line is displayed in red, this indicates that the herd threshold level is being used. If the threshold line is displayed in green, then a separate threshold level is used for the group that the cow is part of. More details on group thresholds can be found in section 10.3 on page 44 and herd thresholds in section 11.2 on page 45.

7.3. Oestrus Detection Threshold

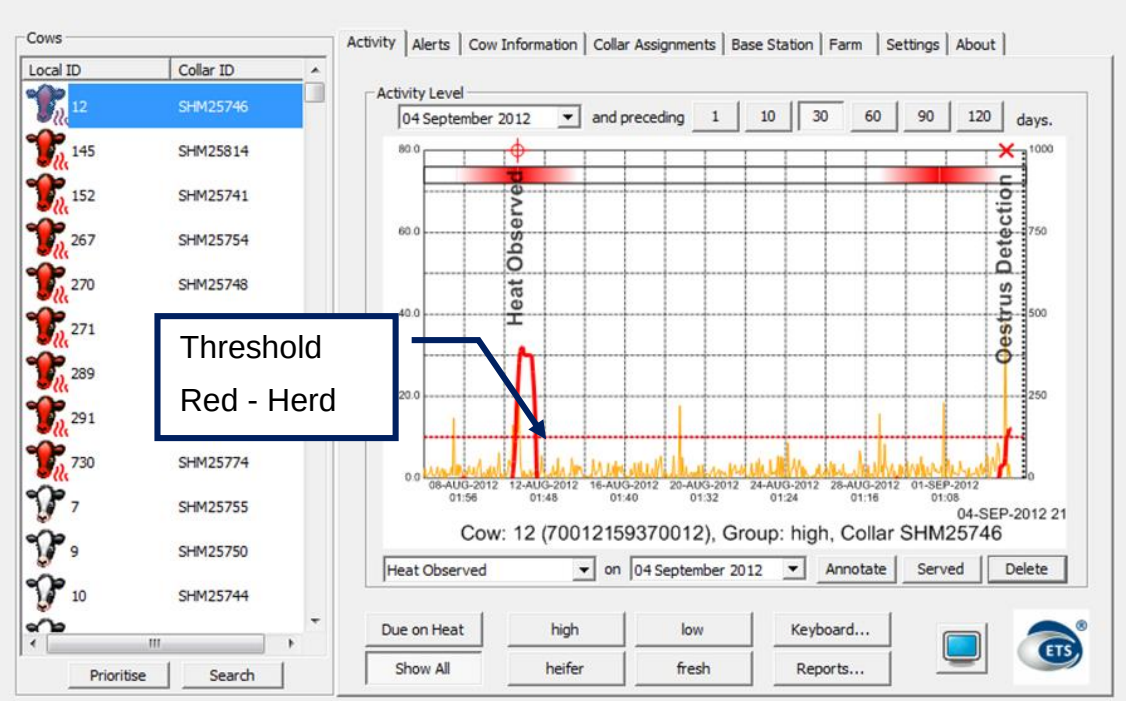


Figure 18 – Threshold for Oestrus detection

7.4. Future Oestrus Events

The Silent Herdsman system will provide an indication of when the next oestrus event is expected, provided ‘Calved’, ‘Served’ or ‘Heat Observed’ annotations have been entered into the system, see section 8.6 about annotations. The next expected oestrus event, 17-24 days since last event is highlighted with a graded red bar above the graph and is illustrated in Figure 19.

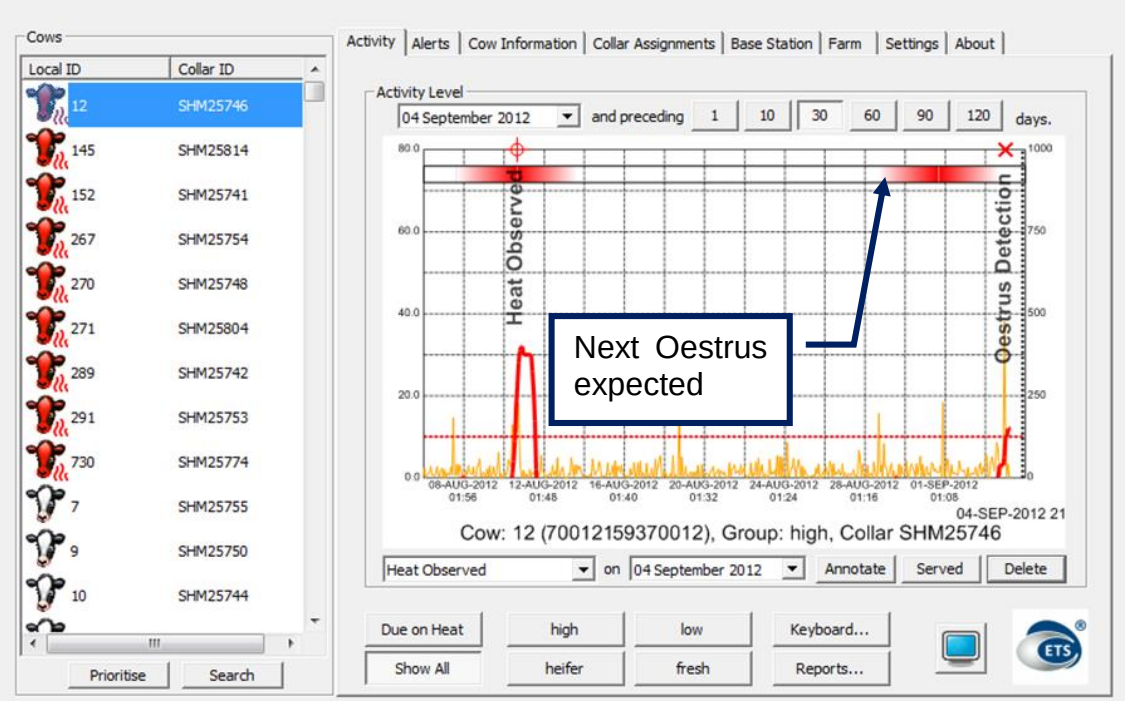


Figure 19 – Next Oestrus Expected indicator

To aid in finding which cows are due to come in heat, pressing the 'Due on Heat' button illustrated in Figure 20, only the cows that are due in heat based on the annotations of 'Calved', 'Served' and 'Heat Observed' will be shown in the cow list on the left.

When the cow is annotated with a 'PD+' to indicate pregnancy this will remove the cow from the 'Due on Heat' list until the animal has calved.

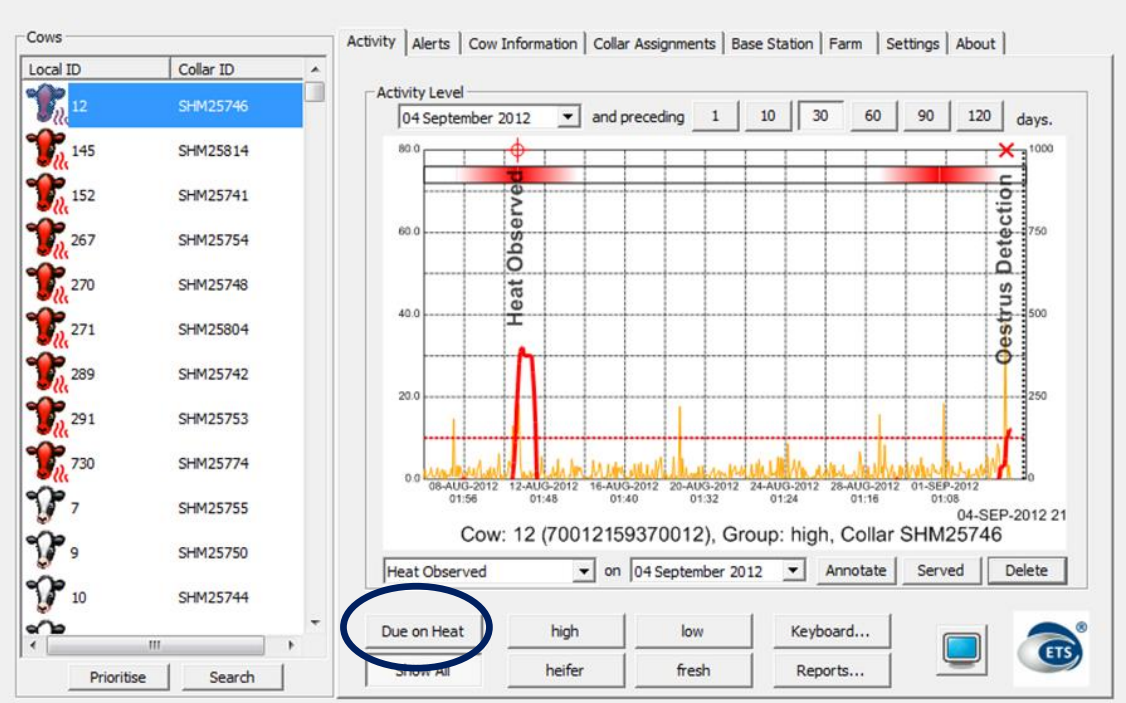


Figure 20 – Shortlist of cows due in heat

7.5. Calving Date Indicator

When the dates for services are annotated within Silent Herdsman a graded green bar is displayed above the graph to indicate the estimated time for calving and is illustrated in Figure 21.

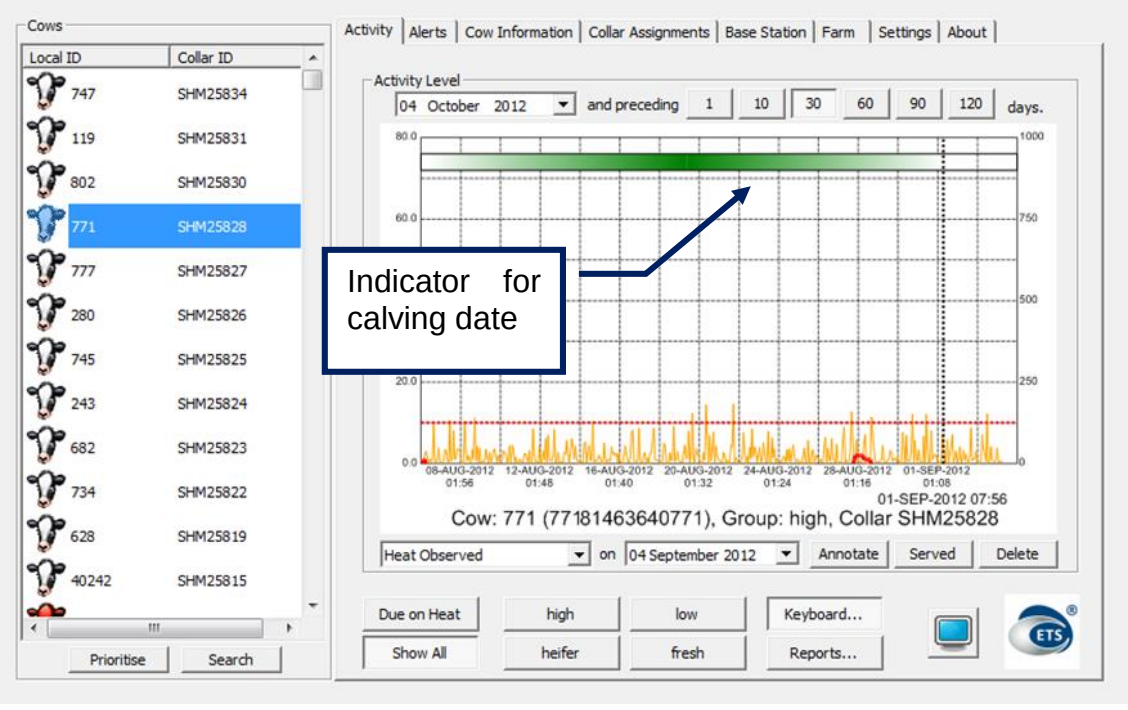


Figure 21 – Indicator for calving date

7.6. Changing Time Period on Activity Graphs

The Silent Herdsman software stores the activity graphs, oestrus indicator graphs and annotations for the previous 18 months for each cow. All of this data can be displayed in the 'Activity' tab. The time period and the number of days that are displayed can be selected, Figure 22 show the controls for changing the dates for which data is displayed.

There are 6 levels of zoom on the data which are selected by pressing either the '1', '10', '30', '60', '90' or '120' buttons,

- **1 day** – Each graph section shows 2 hours
  - Detailed examination of when oestrus detected
- **10 days** – Each graph section shows 1 day
  - Activity of cow leading up to oestrus
- **30 days** – Each graph section shows 2 days
  - Visibility of previous oestrus event
- **60 days** – Each graph section shows 10 days
  - Visibility of previous 2 oestrus events
- **90 days** – Each graph section shows 10 days
  - Visibility of previous 3+ oestrus events
- **120 days** – Each graph section shows 15 days.
  - Visibility of all events from calving

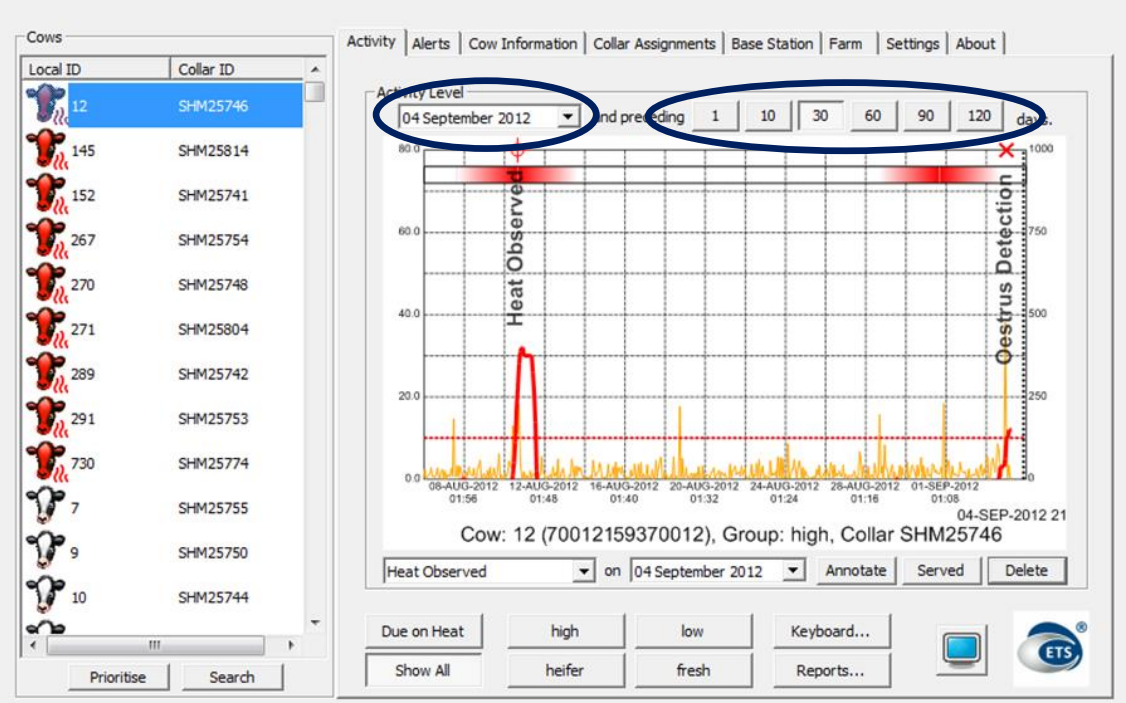


Figure 22 – Changing the activity time period

By touching the graph on the touch screen or passing the mouse cursor over the graph, the Silent Herdsman system dynamical displays the current date and time with a dotted line indicator and text, see Figure 23. This is a useful feature to identify when a particular event occur.

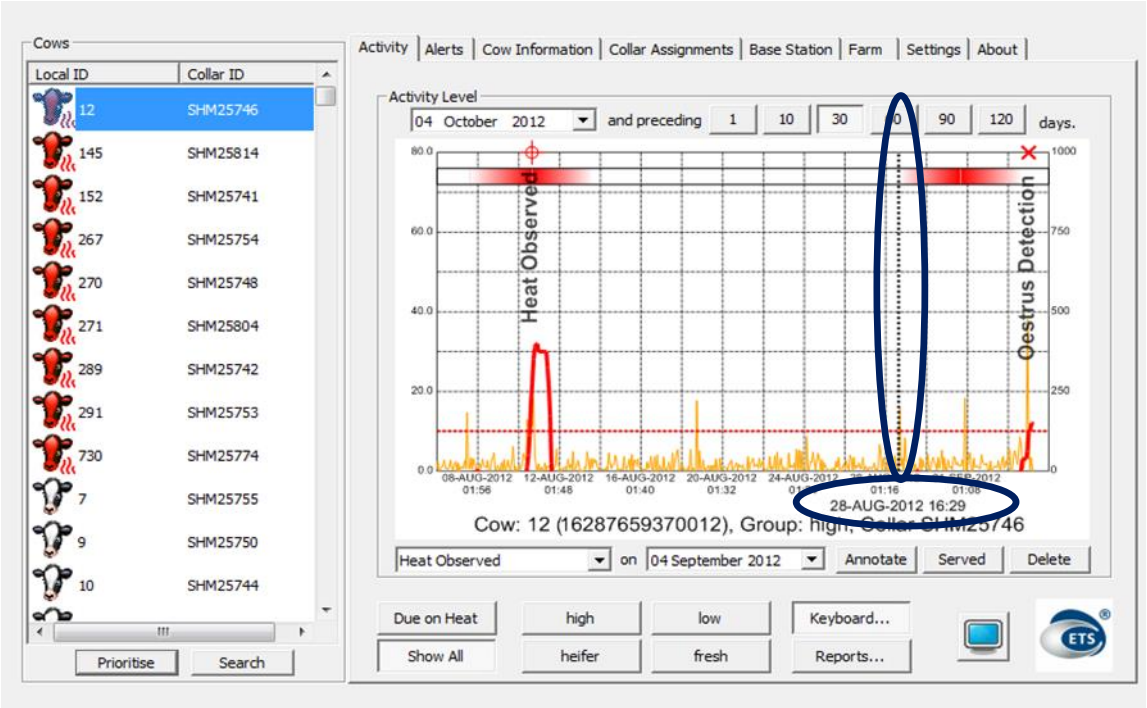


Figure 23 – Identifying date and time on activity graph

8. Alerts

8.1. Overview

A detailed record of alerts is displayed in the ‘Alerts’ tab. These alerts can be accessed either for one specific cow or for the whole herd. To get the alerts for a single cow, select the appropriate cow from the main list on the left hand side, the alerts relevant to the selected cow will be displayed. An example of the ‘Alerts’ tab is shown below in Figure 24.

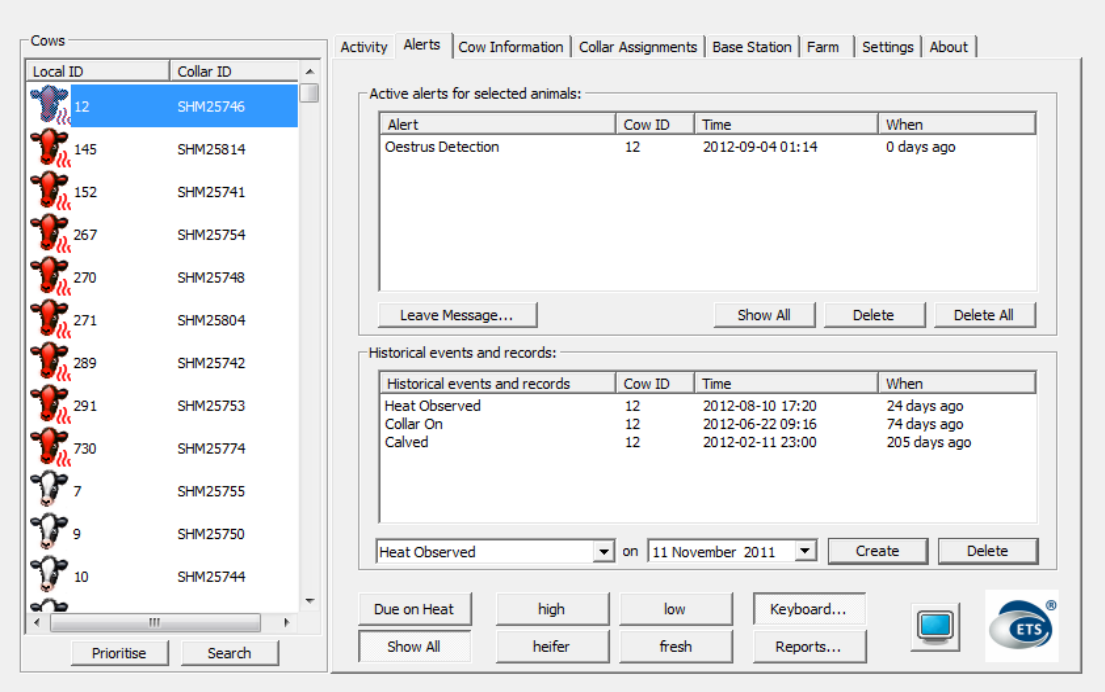


Figure 24: Cow Alert Table

The top section of the Alerts tab displays a list of the currently active alerts that requires action. Figure 24 shows an Oestrus Detection alert that needs attention. The bottom section contains historical events such as services, collar on/off, treatments etc. All the alerts can also be viewed on the activity tab.

In addition to looking at only the active alerts on a single cow it is possible to display all of the current alerts for the complete herd. This is done by clicking on the ‘Show All’ button as displayed in Figure 25. This will return a complete list of active alerts and the times that they occurred. An example of this is shown below.

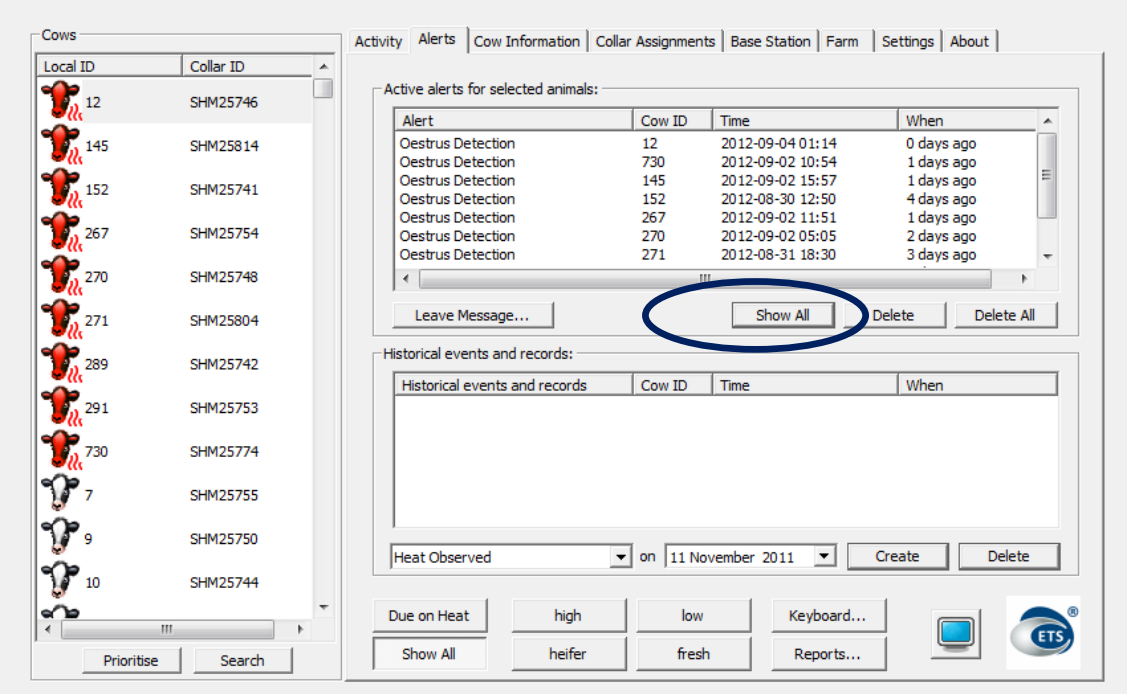


Figure 25: 'Show All' Event Summary Display

Pressing the column headings 'Cow ID' will sort the alerts based on the cow ID, see Figure 26.

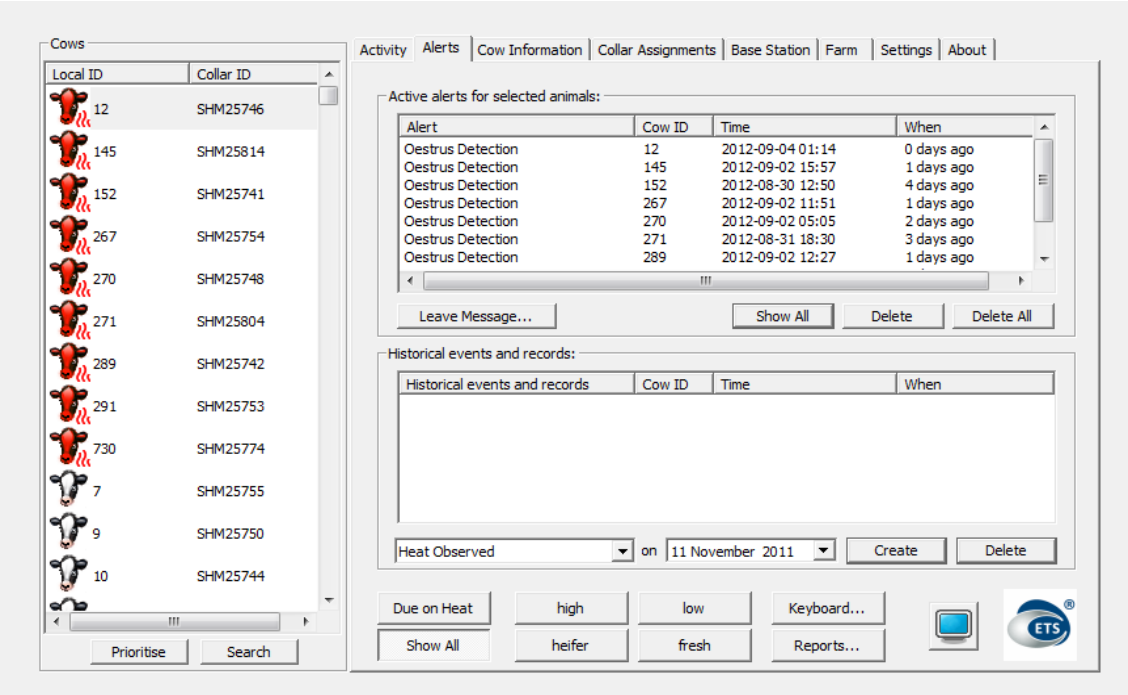


Figure 26 – Alerts sorted by Cow ID

Once an alert has been dealt with the user has the option to delete the alert. This is done by selecting the alert in question and pressing the delete button.

8.2. Multiple Alerts

To delete all the displayed alerts, press the 'Delete All' button. This can be done for all alerts for the selected cow. To delete all alerts on the system for all cows press the 'Show All' first.

8.3. System Alerts

System alerts are indicated by a flashing exclamation mark on the system alerts button. These may be generated for example if a basestation fails to report or a message is left on the system by a user pressing the 'Leave Message' button. The alert will continue to flash until the message is cleared. Pressing the flashing exclamation mark will switch screens to the alerts tab and show all system alerts.

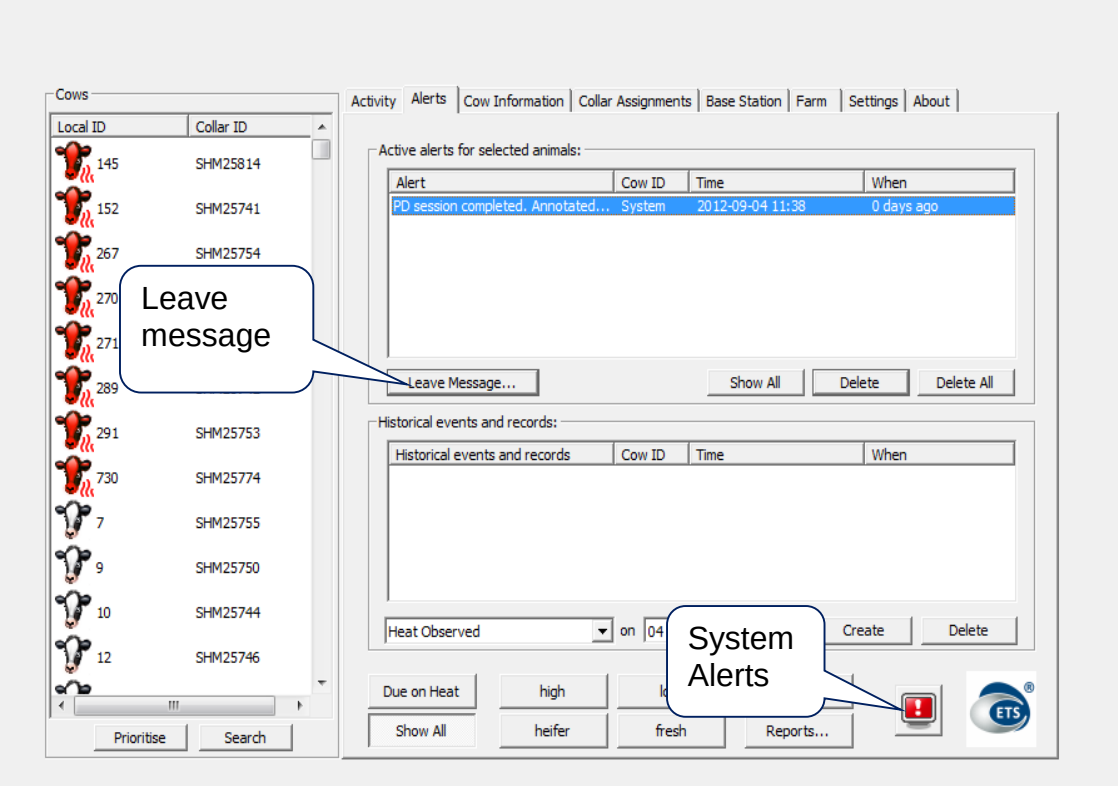


Figure 27 – Flashing 'System Alerts'

8.4. Alert Beacon

The Silent Herdsman system monitors 24/7 and if an alert arrives in the system when the computer is un-attended, the computer will display the flashing 'red cow beacon', see Figure 28.

Figure 28 – Flashing 'Red Cow Beacon'

Touching the screen will remove the flashing red cow and show the Silent Herdsman screen. This beacon will be triggered every 10 minutes if there is an alert on the system.

By default the windows screen saver will come on after 30 minutes of inactivity and will turn the monitor off. The monitor may be started again by pressing the screen.

8.5. Alerts and Activity

Alerts can also be examined and managed in the 'Activity' tab which displays the alerts on a timeline together with the cow activity.

Figure 29 shows the typical display of the cow activity with Silent Herdsman indicating that an oestrus event has been detected.

Figure 29 – Oestrus Detection conversion to Served

An ‘Oestrus Detected’ alert can be converted to a ‘Served’ event by selecting the ‘Oestrus Detected’ alert (touch the ‘Oestrus Detected’ text to select) and then press the ‘Served’ button as shown in Figure 29.

The system will ask for a sire name, enter the name of the sire used. If the sire information does not need to be recorded, press ‘OK’ without entering any text.

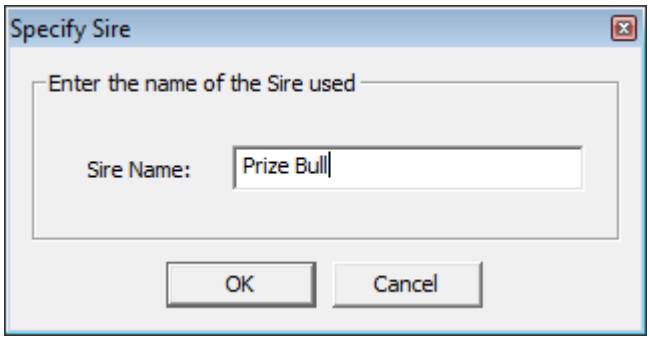


Figure 30 – Oestrus Detection convert to served

Assuming the sire ‘Prize Bull’ is entered, the display will change to that shown in Figure 31 and switching to the ‘Alerts’ tab, see Figure 32, will show the ‘Served’ event and the associate sire’s name, in this case ‘Prize Bull’. If no sire name is entered, only ‘Served’ will be displayed for the event. Additionally a ‘Heat Observed’ annotation will also be placed where the detection of the Oestrus occurred.

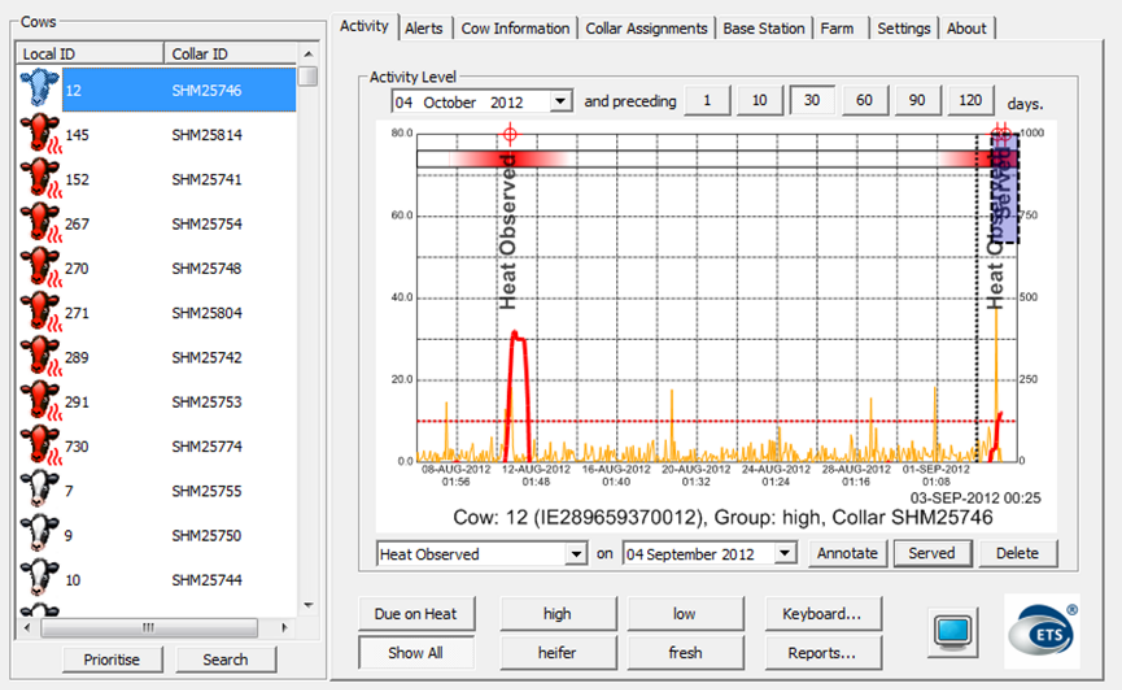


Figure 31: Resulting Served Event

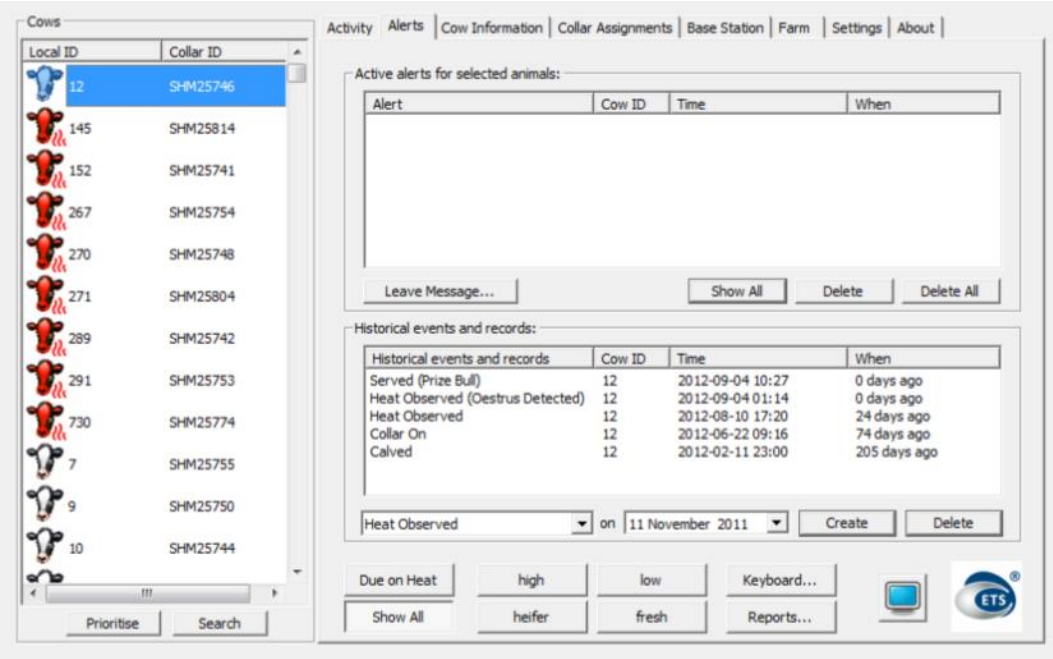


Figure 32: Alerts show name of Sire

This conversion process will change the annotation on the activity chart and also remove the alert from the alert list.

Note the cow icon changes from a red cow to a normal cow.

Note the ‘Served’ annotation is placed at today’s date rather than the original date of the ‘Oestrus Detection’ annotation. ‘Heat Observed’ is placed at the detection date.

8.6. Annotations

The activity trace can be annotated by accessing the drop down menu and calendar. This allows information relating to the cows welfare to be recorded, for example treatment by farm staff on a particular day, vet treatment, observation of illness, or if the cow was served, see Figure 33. Once entered, this information will be tagged to the cow so that it is always displayed as shown in Figure 34. Select the event that you wish to record, select the date and then press ‘Annotate’.

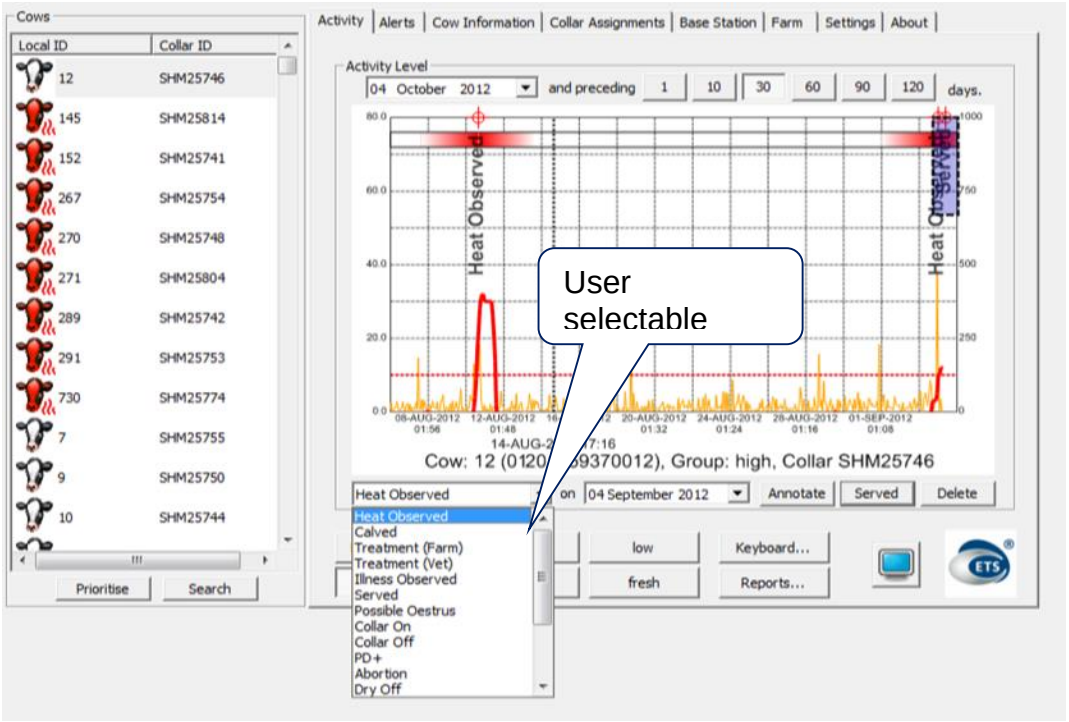


Figure 33 – Selection of annotation types

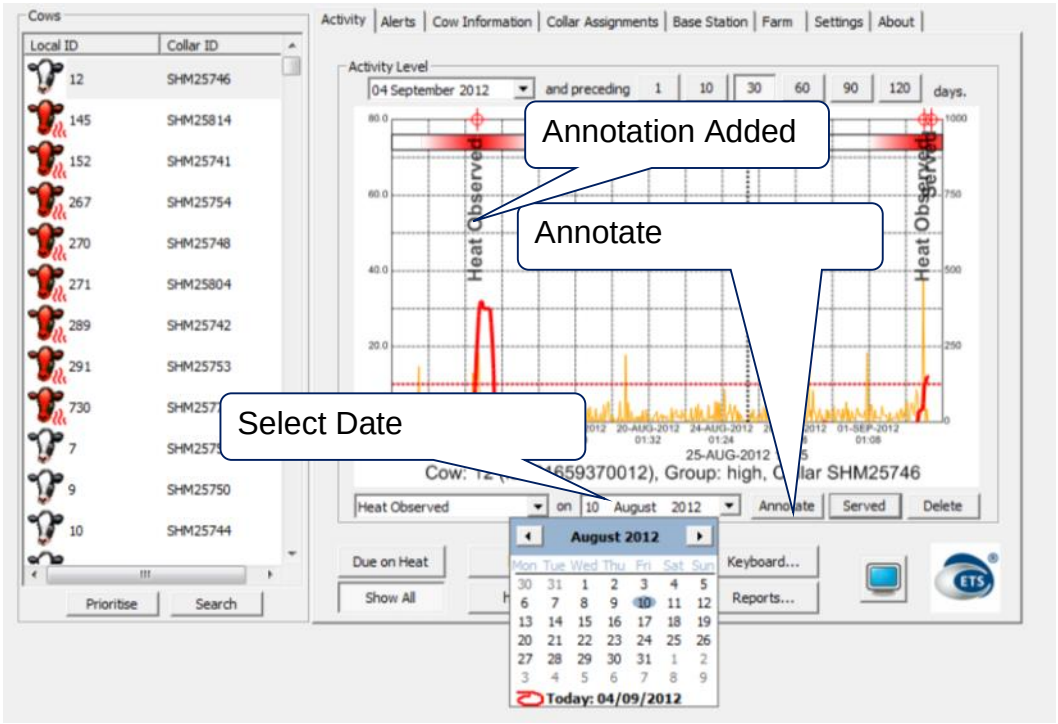


Figure 34 – Annotation added

If an error has been made with an annotation, select the annotated event by touching the text of the desired annotation and pressing the ‘Delete’ button to remove.

8.7. Email Alerts

The Silent Herdsman system will automatically email alerts to all emails in the farm tab, up to 3 email addresses are available, if the system is connected to the internet.

Complete the information about the farm and enter the email addresses and **press ‘Save’.** Emails will be sent as alerts are created.

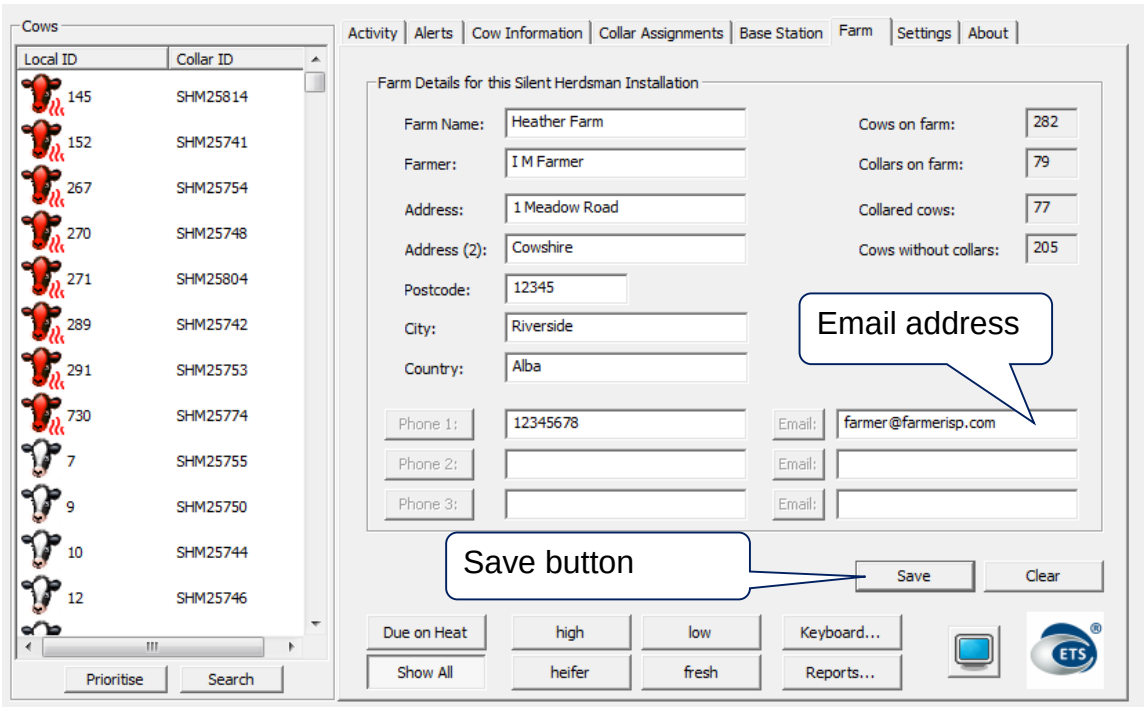


Figure 35 – Add email for alerts

9. Collars

9.1. Introduction

The ‘Collar Assignments’ tab enables the management of Silent Herdsman collars available on farm. Selecting the ‘Collar Assignments’ tab will display a screen similar to Figure 36

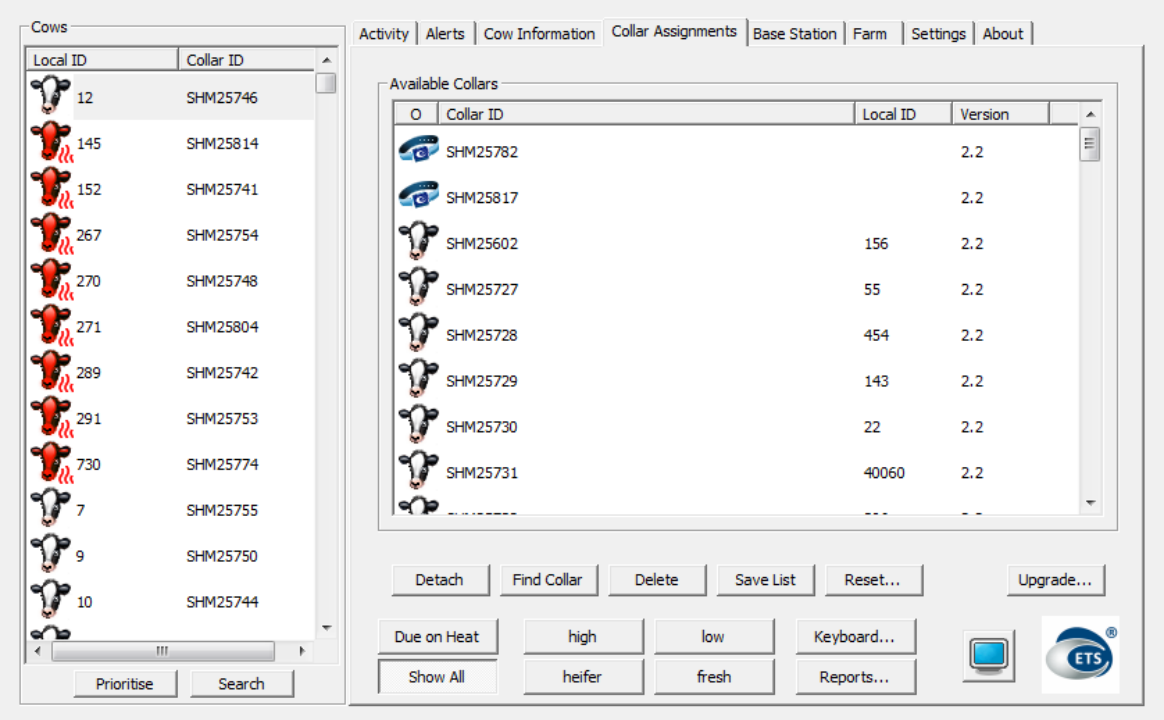


Figure 36 – Collar assignments Tab

A list of all collars available on farm is displayed where collar numbers with the ‘blue collar’ icon indicate that these collars are not attached to cows. Collar numbers with a cow icon to the left indicate that these collars are attached to cows and are currently monitoring the cow for oestrus. The Local ID of the cow that the collars are attached to is displayed in the ‘Local ID’ column.

The last column, ‘Version’ indicates the version of the Artificial Intelligence software that is running on that specific collar. This is used to identify collars that can be upgraded, see section 0 on page 60 for more details.

Collars can be sorted in different ways by pressing the heading at the top of each column, the sorting is as follows

- ‘**O**’ – sort by unattached and then attached collars. Unattached at top of list
- ‘**Collar ID**’ – Sort by value of collar ID
- ‘**Local ID**’ – Sort by Local ID of cow. Unattached collars at bottom of list
- ‘**Version**’ – Sort by version of software on collar

9.2. Attaching collars to cows

In the same way that each cow has a unique ID number, the collars that are attached to the cow, each have their own unique ID number, which is visible on the outside of the collar.

The collars will automatically register their IDs with the farm computer within 1.5 hours of the installation. Any additional collars that are purchased after installation will also automatically register.

When a collar is placed on a cow, the monitor software must be updated by assigning the collar ID to the corresponding cow ID.

The collar ID can be found on the outside of the sensor box

A collar is assigned by first selecting the 'Collar Assignments' tab at the top of the screen and the display will change as shown in Figure 37

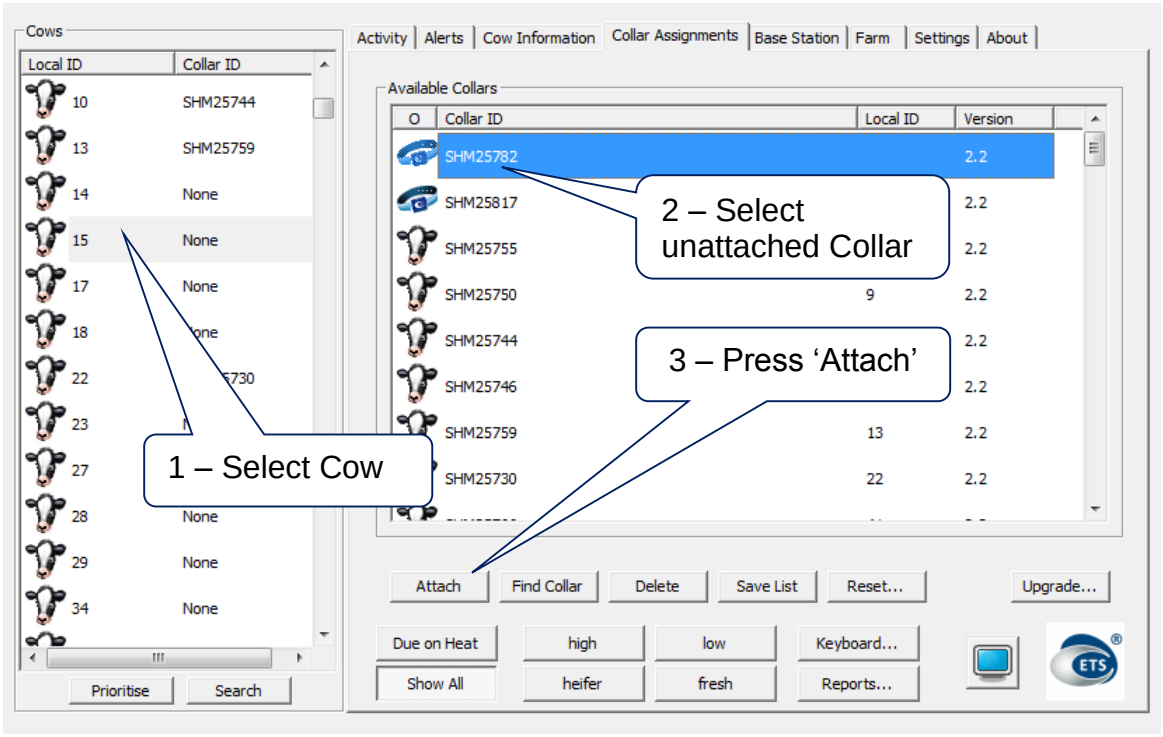


Figure 37 – Display of Collar assignments

The assignment is then carried out by selecting the appropriate cow ID and selecting the relevant collar ID and pressing the 'Attach' button, which records this attachment in the monitor software Figure 37 shows a collar and a cow selected for attachment. After the 'Attach' button has been pressed to confirm the assignment the display will change to Figure 38 where it will be seen that cow ID '115' and collar ID 'NMR16436' are now paired and collar 'NMR16436' is no longer available for assignment.

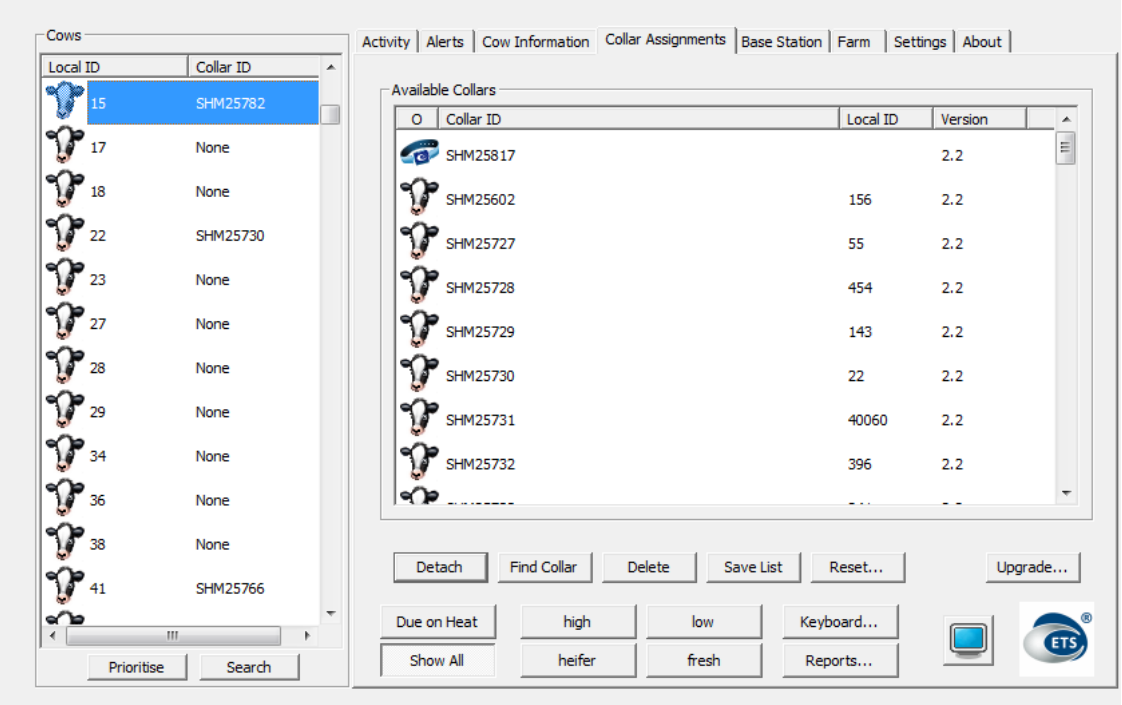


Figure 38: Display of assigned collar

9.3. Detaching Collars from Cows

If a collar has been removed from a cow, the monitor software must be updated to reflect that the collar have been detached from the cow, otherwise it will continue to try and obtain data from the collar.

To detach a collar in the monitor software, select the ‘Collar Assignments’ tab at the top of the screen to get the display as shown in Figure 39.

The process to detach a collar ID from a cow is to select the appropriate cow ID from the main herd list on the left hand side. The example in Figure 39 has selected cow ID ‘15’.

Pressing the ‘Detach’ button will detach the collar from the cow.

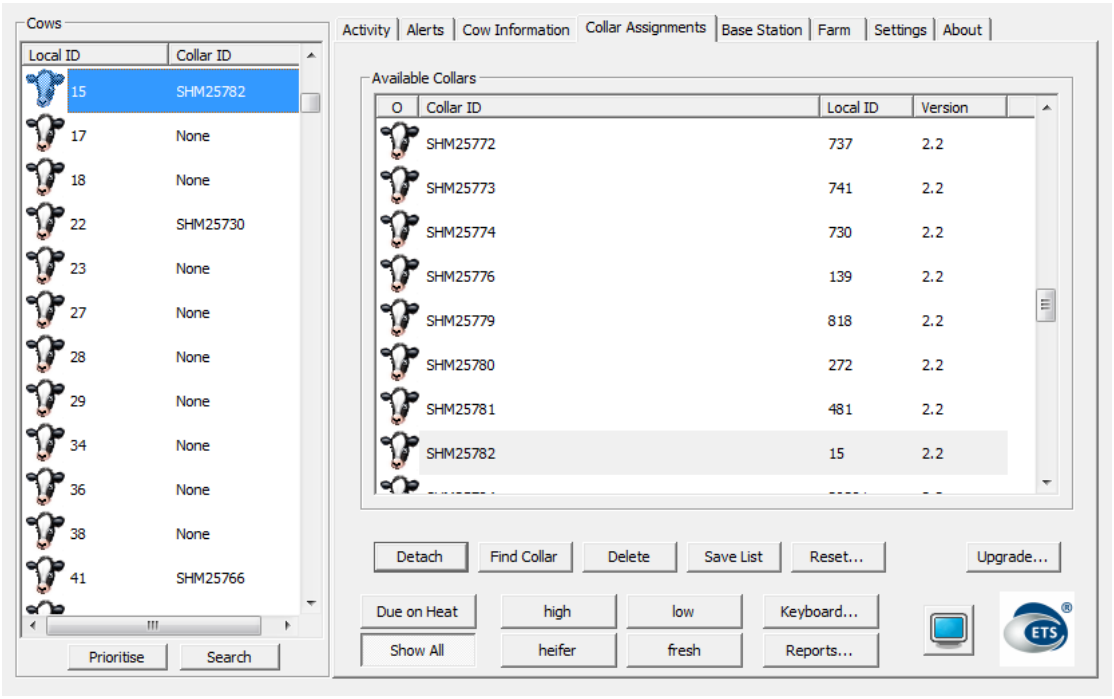


Figure 39 – Display of selected cow

The display will be updated, see Figure 40, to show that the Cow ID, '15', and collar ID, 'SHM25782', are again available if they need to be attached in the future.

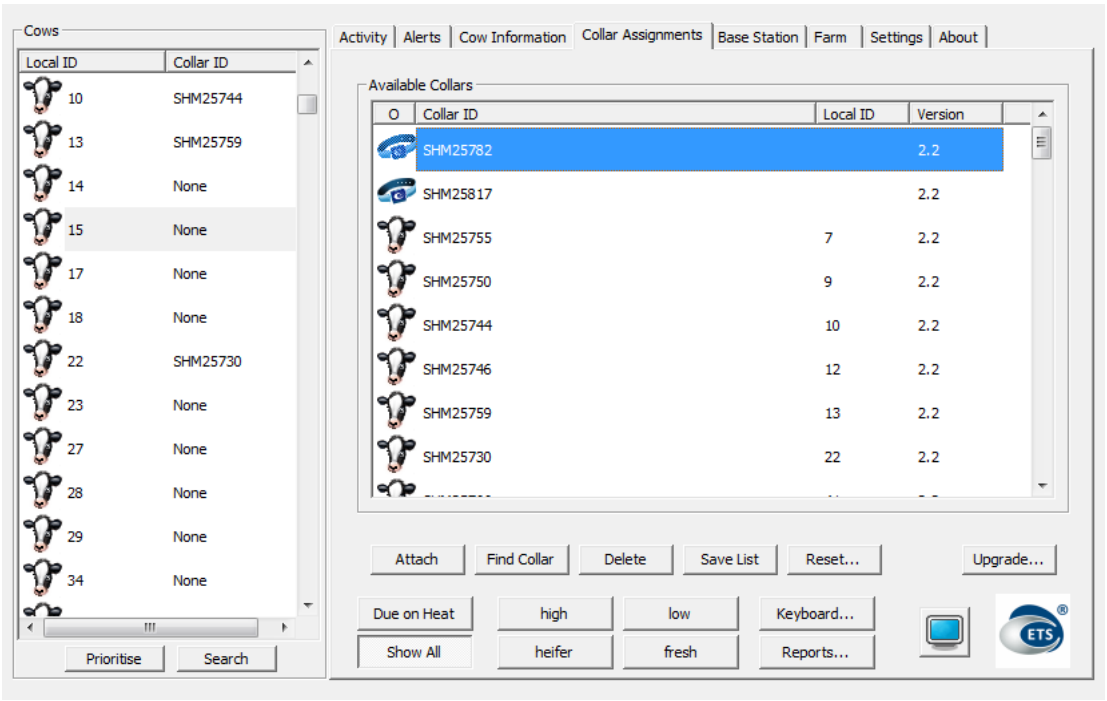


Figure 40: Collar detached

The same button is used for ‘Attach’ and ‘Detach’ which changes context automatically. The button will display ‘Detach’ when a collared cow is selected and will display ‘Attach’ when an uncollared cow AND unattached collar are both selected.

9.4. Finding Collars

A search tool is provided to find a particular collar number, this is done by pressing the ‘Find Collar’ button and a window will appear as shown in Figure 41.

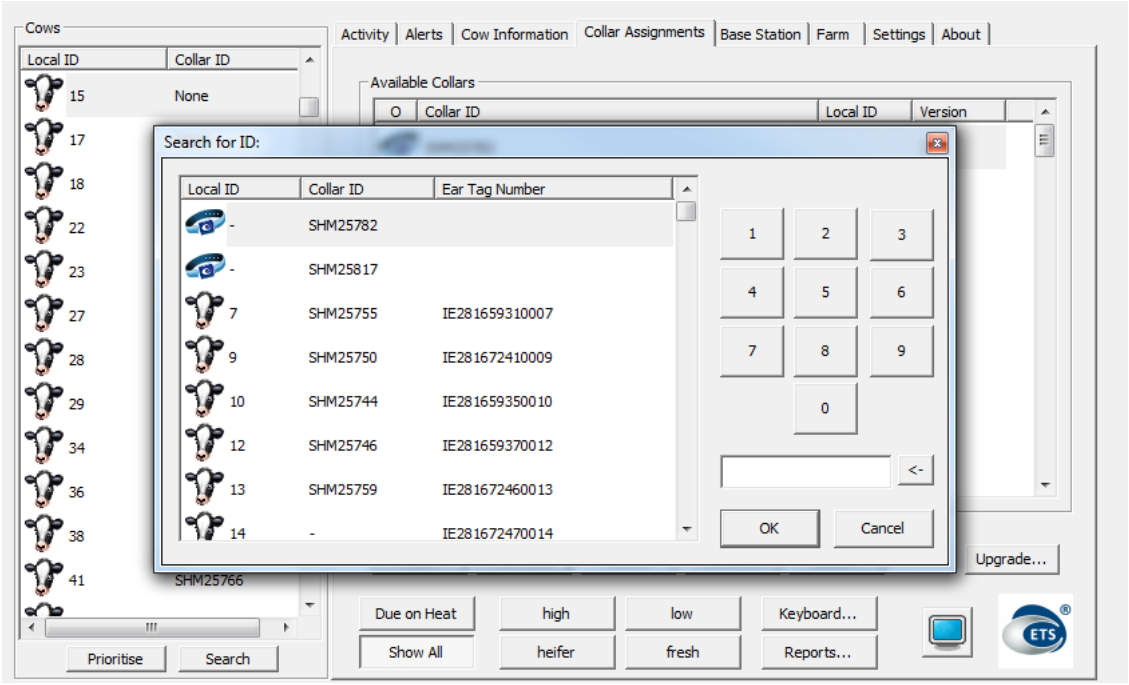


Figure 41 – Search window for Collars

Enter the number of the collar and press ‘OK’ to search for the collar in the list, when the collar is found, it will appear highlighted. This search function will find a collar whether it is attached to a cow or unattached.

9.5. Deleting Collar

If a collar is no longer used on the farm, first select the collar from the list and then press the ‘delete’ button. The Collar will be removed from the system. If the collar was attached to a cow the collar is automatically detached from the cow before deletion.

There is the option to delete all the **unattached** collars from the system using the ‘Reset…’ button. If the collars are still available on the farm then they will automatically re-register themselves on the Silent Herdsman system.

9.6. Saving List of Attached Cows

If a record is required of the list of cows which have collars attached, the ‘Save List’ allows an Excel compatible CSV file to be save of the Local ID’s and Collar ID’s

10. Cow Information Table

10.1. Overview

Relevant cow information is displayed in the “Cow Information” tab which can be accessed in the event of a collar alert or at any time the farmer chooses to do so.

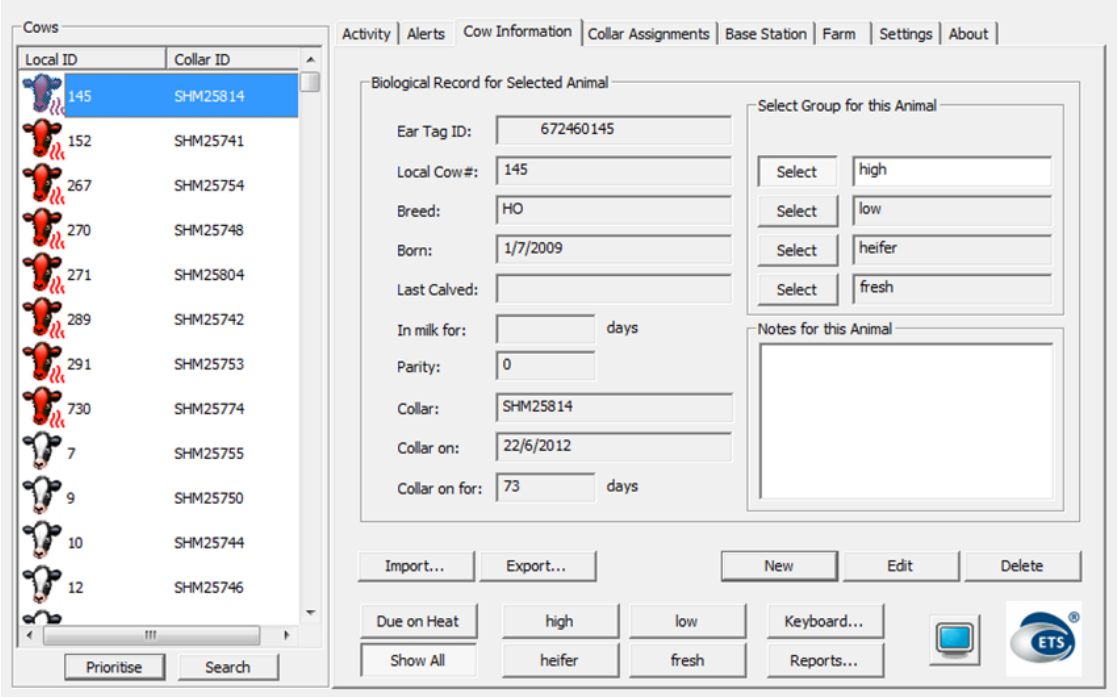


Figure 42: Cow information table

If the data for a cow needs to be changed then pressing the ‘Edit’ button will allow the data to be updated. An editing window will appear together with an on screen keyboard to enter text as shown in Figure 43.

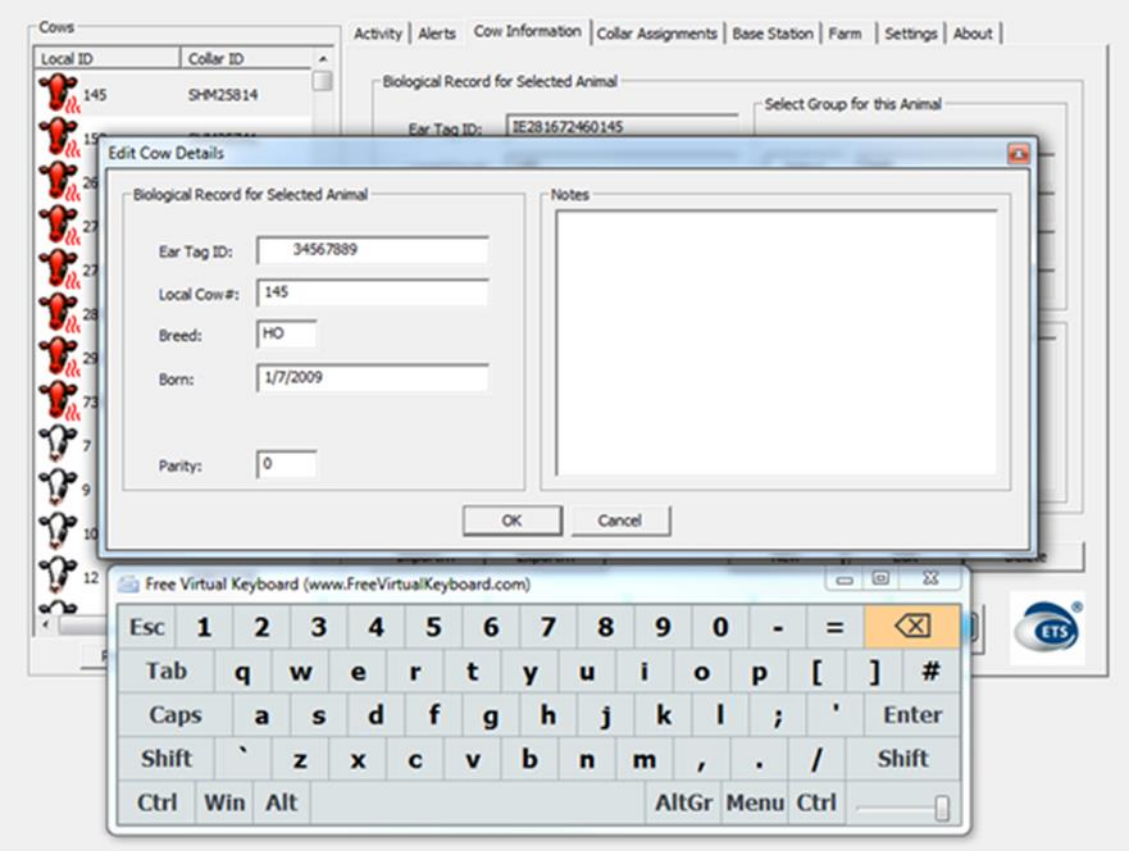


Figure 43 – Editing of Cow Information

If a cow is no longer with the herd and the data is no longer required, selecting ‘Delete’ will remove the cow and all associated information from the system.

10.2. Importing Herd Information

When the information for a large number of cows needs to be entered, it is possible to import the data from an external file. The file needs to be a CSV format and the fields and associated order, is as follows

- Eartag – Ear Tag ID
- Cow Number – Local ID
- Breed
- Date of birth - format yyyy-mm-dd^hh:mm:ss
- Last calving date – (youngstock do not have a calving date), format as above
- Lactation number – parity

Pressing the ‘Import’ button and selecting the appropriate CSV file will then start the import process.

An example of the contents of the CSV file is

UK123456781,10001,SR,01/01/2001 00:00,01/01/2011 00:00,1

UK123456782,10002,SR,02/02/2002 00:00,02/02/2011 00:00,2

UK123456783,10003,SR,03/03/2003 00:00,03/03/2011 00:00,3

10.3. Cow Groups

Cows can be placed into separate groups by pressing one of the 'Select' buttons shown in Figure 44 to place the cow into that group.

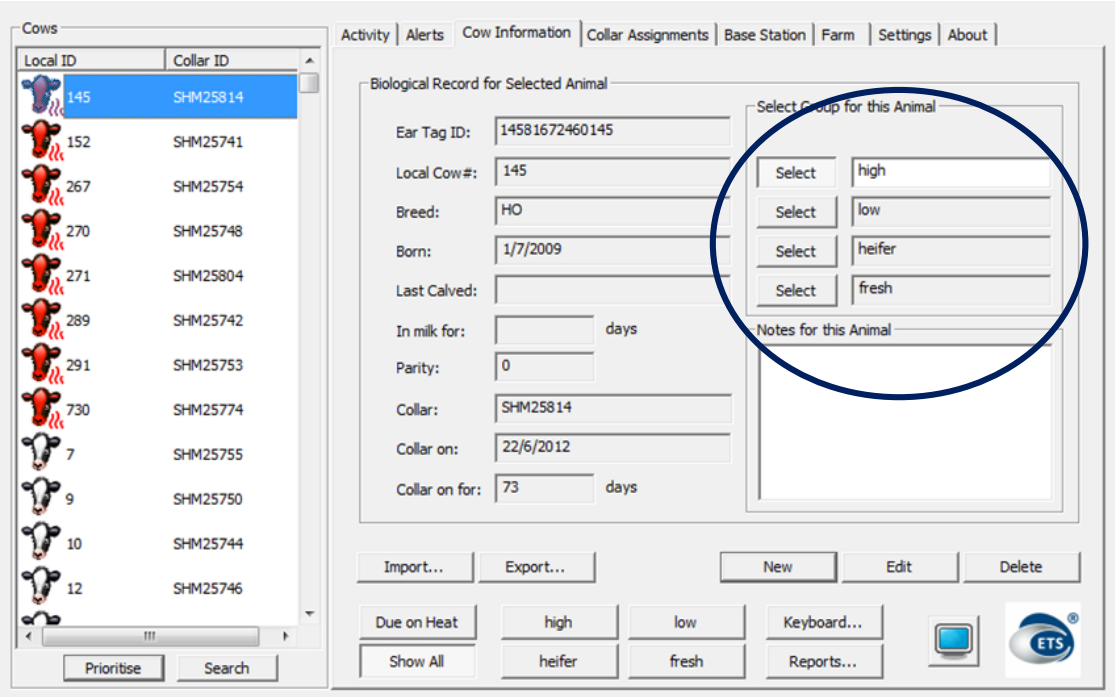


Figure 44: Cow Group Selection

11. Settings

11.1. Overview

Silent Herdsman is a flexible and expandable system, the computer enables many features of the software to be configured by the user. The ‘Settings’ tab contains the controls that allow settings to be change on the computer.

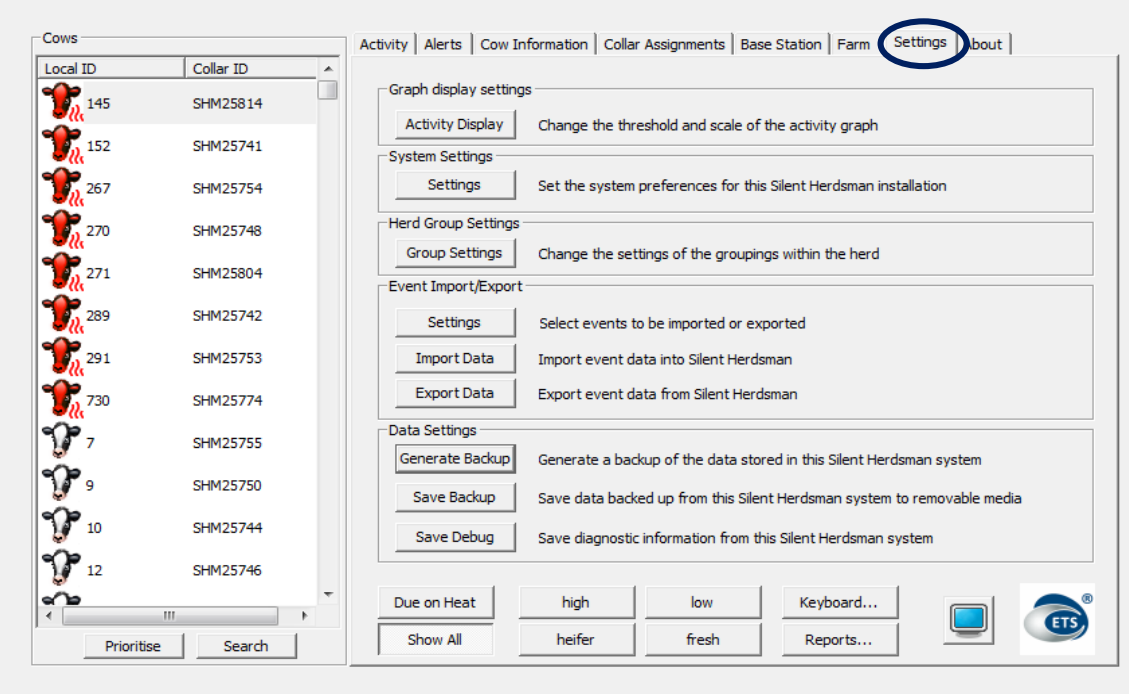


Figure 45: Main Settings tab

11.2. Activity Display

It is possible to change the scale of the activity graphs and the oestrus graphs to effectively magnify or reduction the scale on the axis. Figure 46 shows the settings window for the activity graph display. Press the ‘+’ or ‘-‘ button to increase or decrease the relevant value, or alternatively type in the number directly.

Pressing the ‘refresh’ button will update the image of the graph to feed back what impact the selected settings will have.

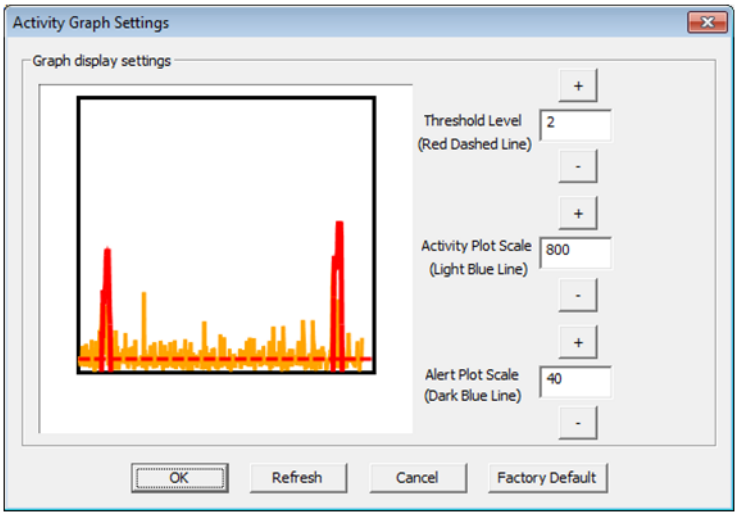


Figure 46: Activity Graph Settings

11.3. System Settings

Customisation of system operations can be done by pressing the 'Settings' button under 'System Settings' where the following dialog will appear.

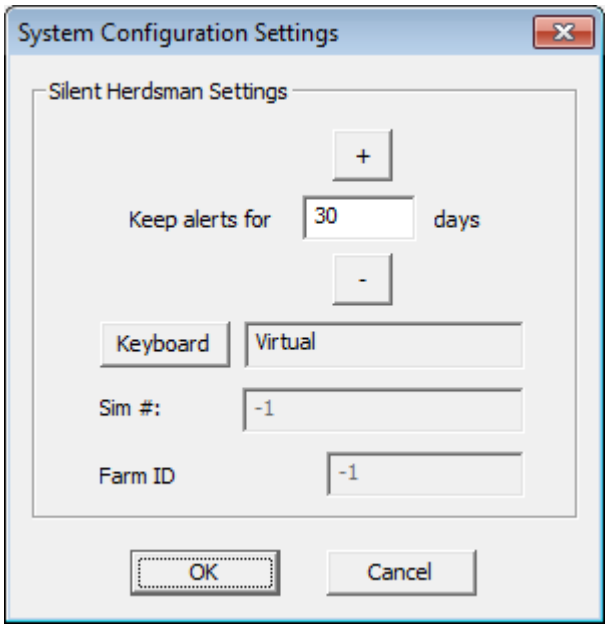


Figure 47: System Configuration Settings

By default the system deletes any active alerts such as 'Oestrus Detection' after 30 days. However this period can be changed by the user with a minimum allowable setting of 3 days. This is set in the 'Keep alerts for' value.

If a physical keyboard is connected to the Silent Herdsman computer then there is no requirement for the on screen keyboard. Switching keyboard mode from 'Virtual' to 'Physical' by pressing the 'Keyboard' button will disable the pop up on screen keyboard.

The 'SIM #' and 'Farm ID' values are for use by ETS and should not be changed

11.4. Group Settings

Cows can be placed into one of four groups. Selecting the group settings allows different characteristics to be set up for each group.

Group Labels

Pressing the 'Rename' button for a particular group allows the label text for that group to be changed.

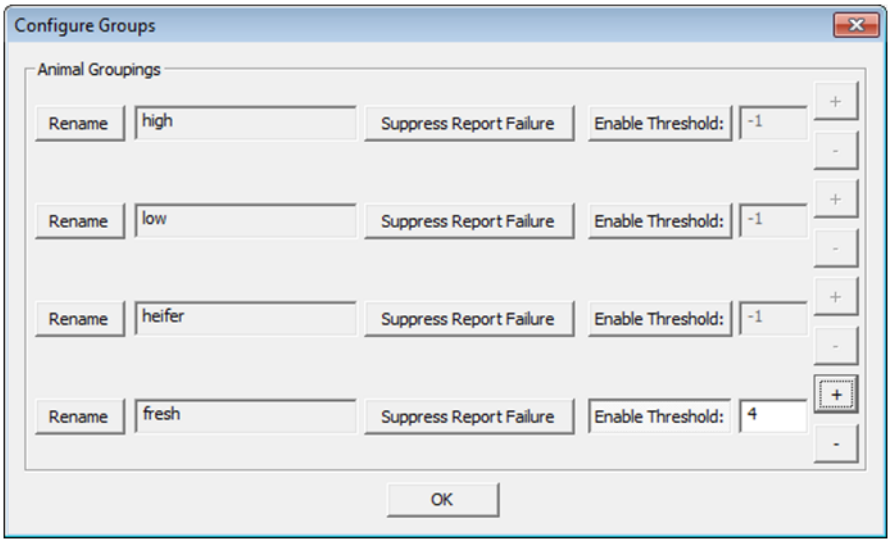


Figure 48: Group Settings

Out of Range cows

If cows will be out of range from a base station for more that 1-2 days, the Silent Herdsman system will flag up that there is an error with the collar since it is not able to communicate with it. Pressing the 'Suppress Report Failure' toggle button will disable the error reporting feature which can then be re-enabled when the cows are back in range of the base station.

Group Thresholds

Different cows can exhibit different oestrus behaviour and show different levels of activity. It is possible to set different trigger thresholds for each group of cows in the system. Pressing the 'Enable Threshold' toggle button for a group will indicate that the group threshold shall be used rather than the herd threshold.

When the group threshold is enabled, the threshold level will be shown in green rather than red in the activity graph for any cow in that group.

11.5. Data Exchange

Silent Herdsman allows the exchange of event data with systems that support the Silent Herdsman data exchange format. Event data can be imported to and exported from Silent Herdsman in the event import/export settings page.

Exporting data

Data is exported by selecting the 'Export Data' button in the Settings tab, see Figure 49**Error! Reference source not found.**.

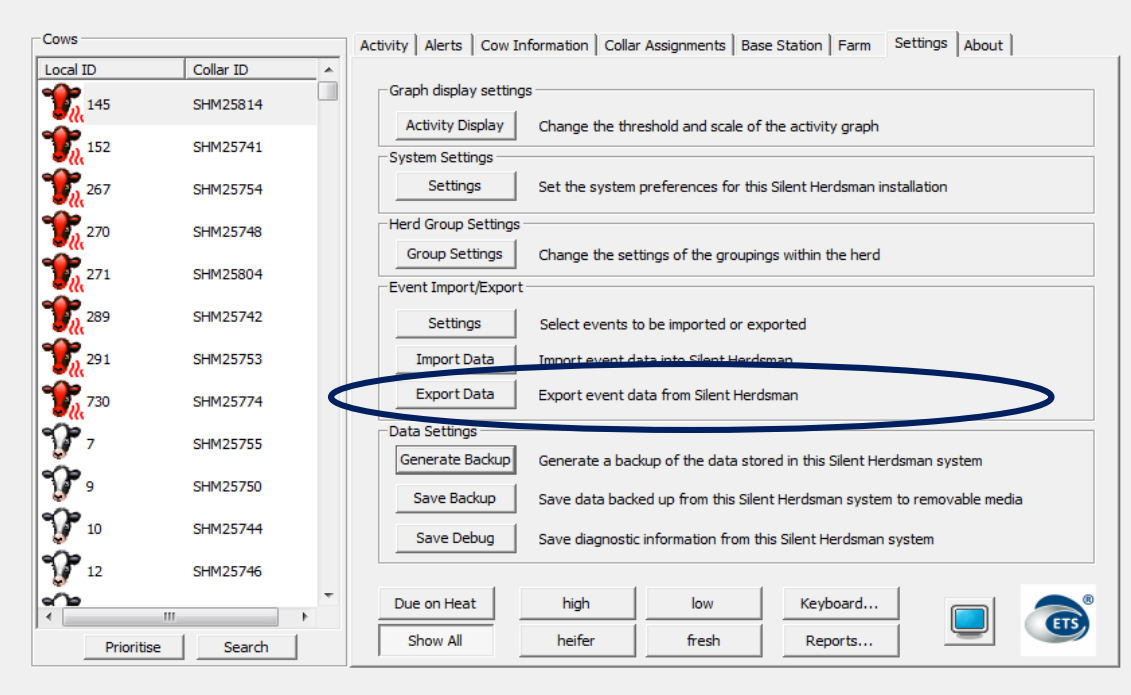


Figure 49: Exporting Data

A dialog box is displayed requesting the location and file name of where to store the data, this can be on a removal USB drive if the data is to be transferred to another computer.

After pressing 'Save' the data is exported and saved to the selected file.

Importing Data

Data is imported by selecting the 'Import Data' button in the Settings tab, see Figure 50.

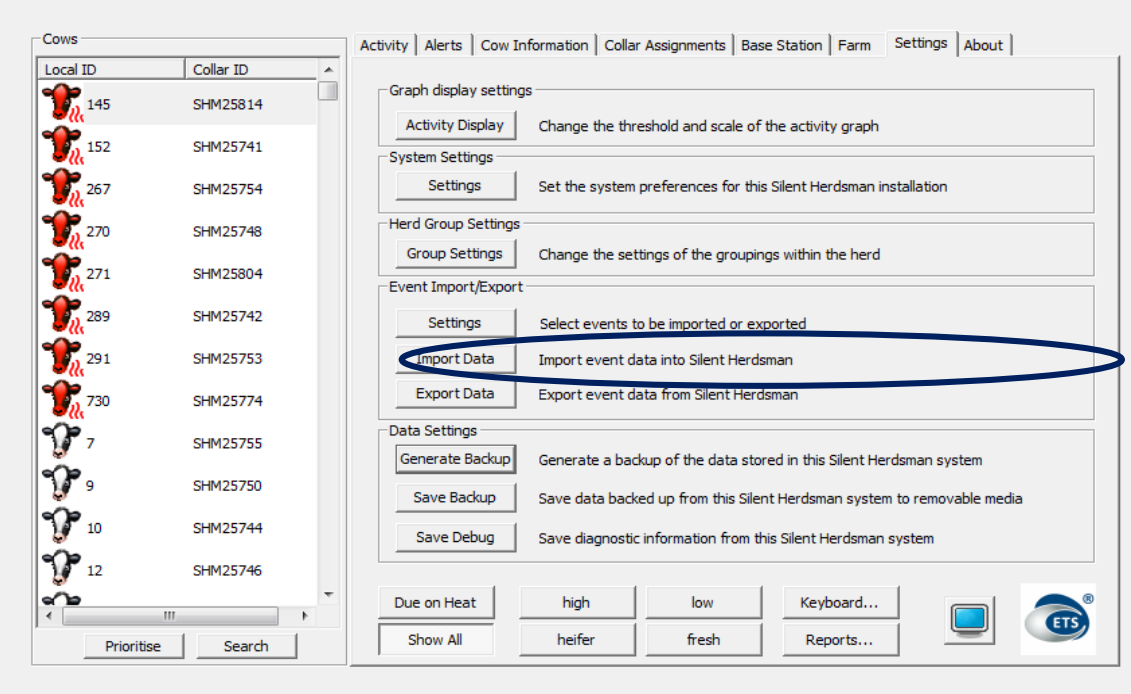


Figure 50: Importing Data

A dialog box opens to allow the data file to be selected and this is then imported into Silent Herdsman.

Settings for Data Exchange

The event data to be imported and exported can be configured by selecting the 'Settings' button shown in Figure 51

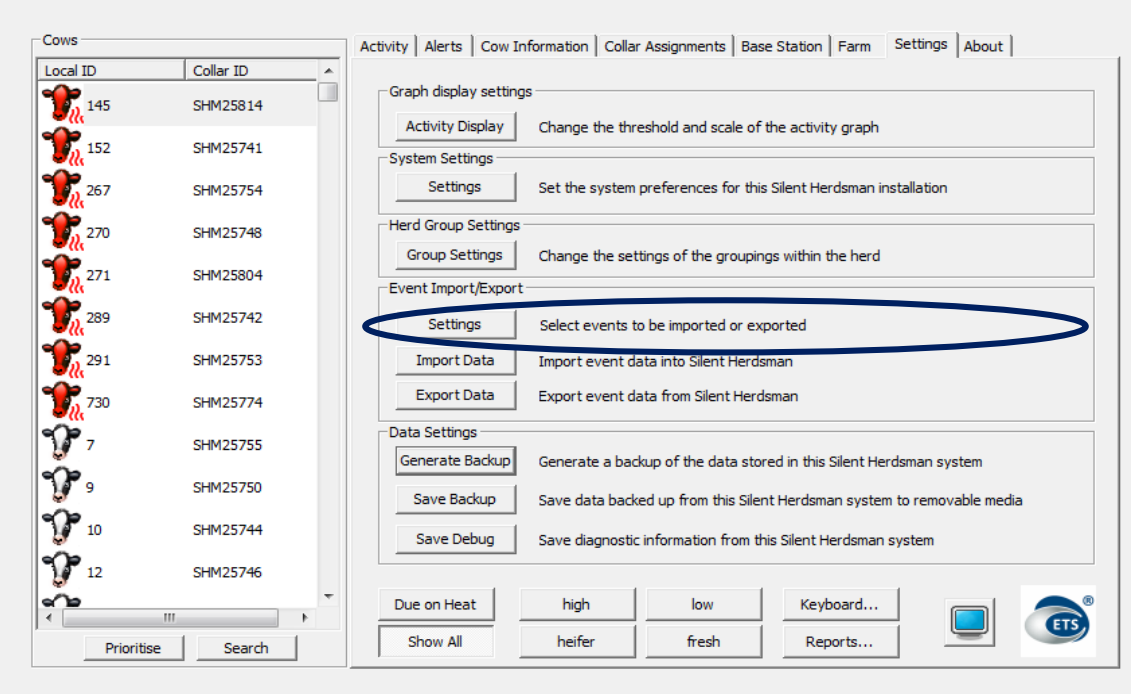


Figure 51: Configuring Data Exchange settings

This will open the dialog box shown in Figure 52. By checking the box for each annotation, this will either enable or disable that annotation. Figure 52 shows the annotations that will be imported, if there is a tick in the selection box then the corresponding event data will be imported and displayed on the activity graph and in the alert event history in the 'Alerts' tab.

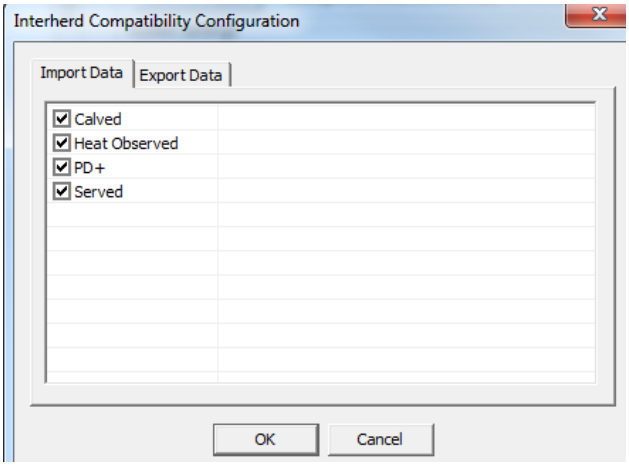


Figure 52: Import Settings

Silent Herdsman provides separate control for the events that are exported. The events to be exported are controlled by selecting the 'Export' tab in the dialog box and again checking the appropriate selection boxes for the events to be exported, see Figure 53.

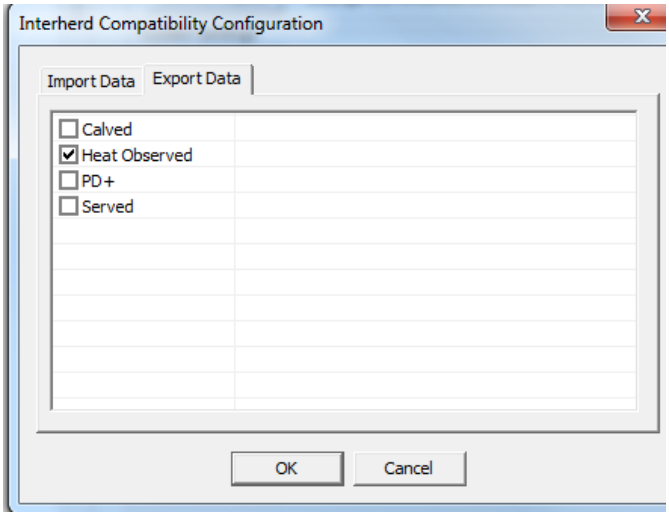


Figure 53: Export Settings

11.6. Data Backup

It is recommended to back up data regularly to a USB drive. To carry out a backup, insert the USB drive in one of the USB slots located on the lower edge of the computer

Go to the ‘Settings’ tab and press the ‘Save Backup’ button, a request to select the file location for saving the data is given, when selected a backup will be made.

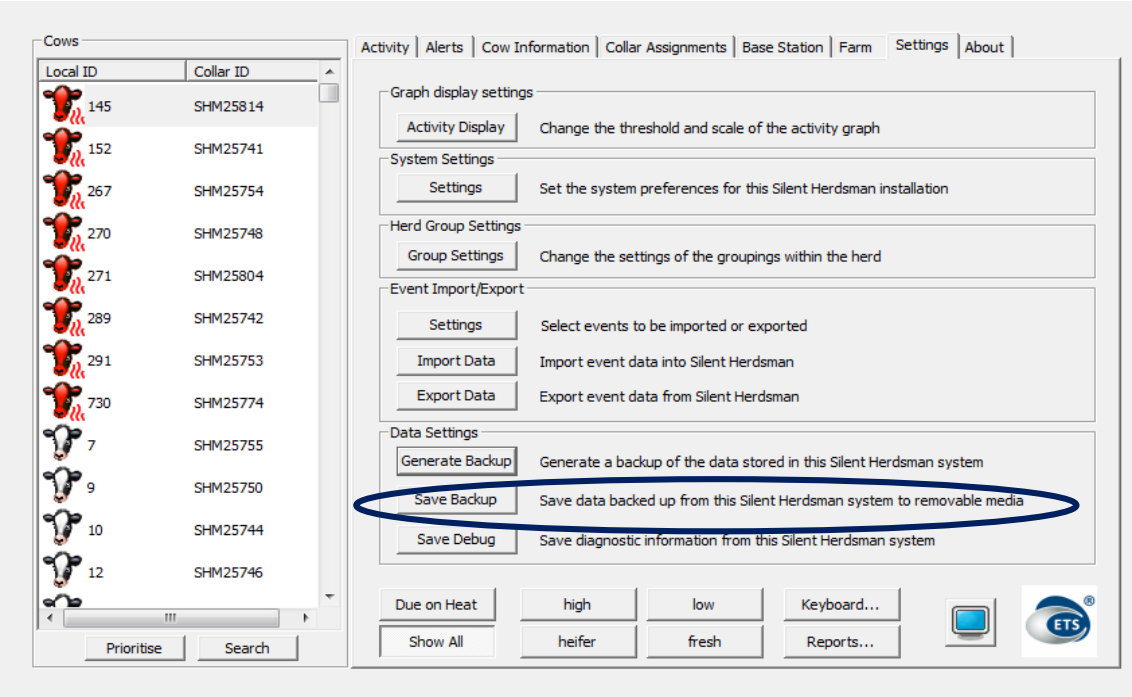


Figure 54: Data Backup

TIP – If a USB Stick is left in the computer, the system will automatically create a nightly backup onto the USB stick.

11.7. Reports

A number of reports can be generated by the Silent Herdsman system by pressing the ‘Reports…’ button and selecting the desired option.

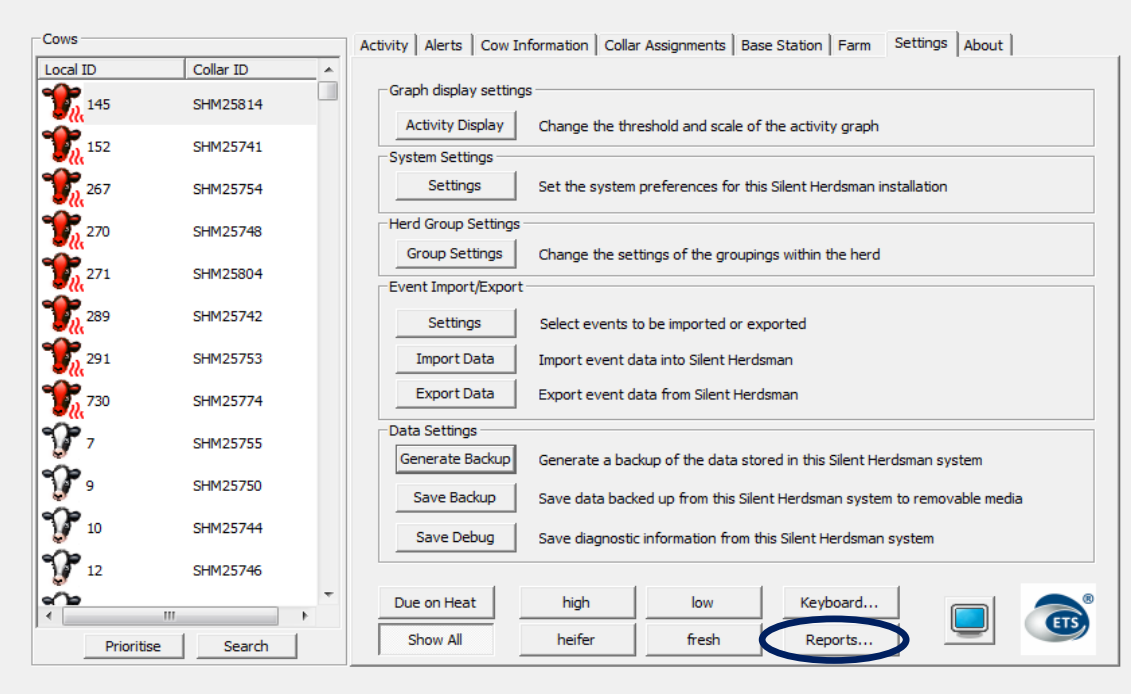


Figure 55: Print List

When the 'Reports…' button is pressed the following dialog box appears.

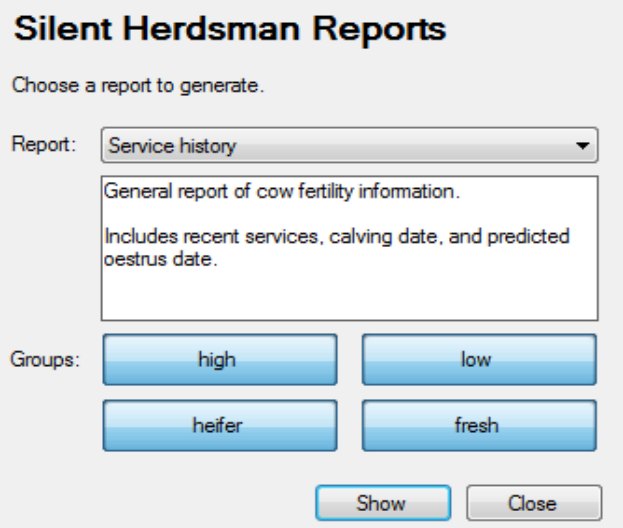


Figure 56: Report selection

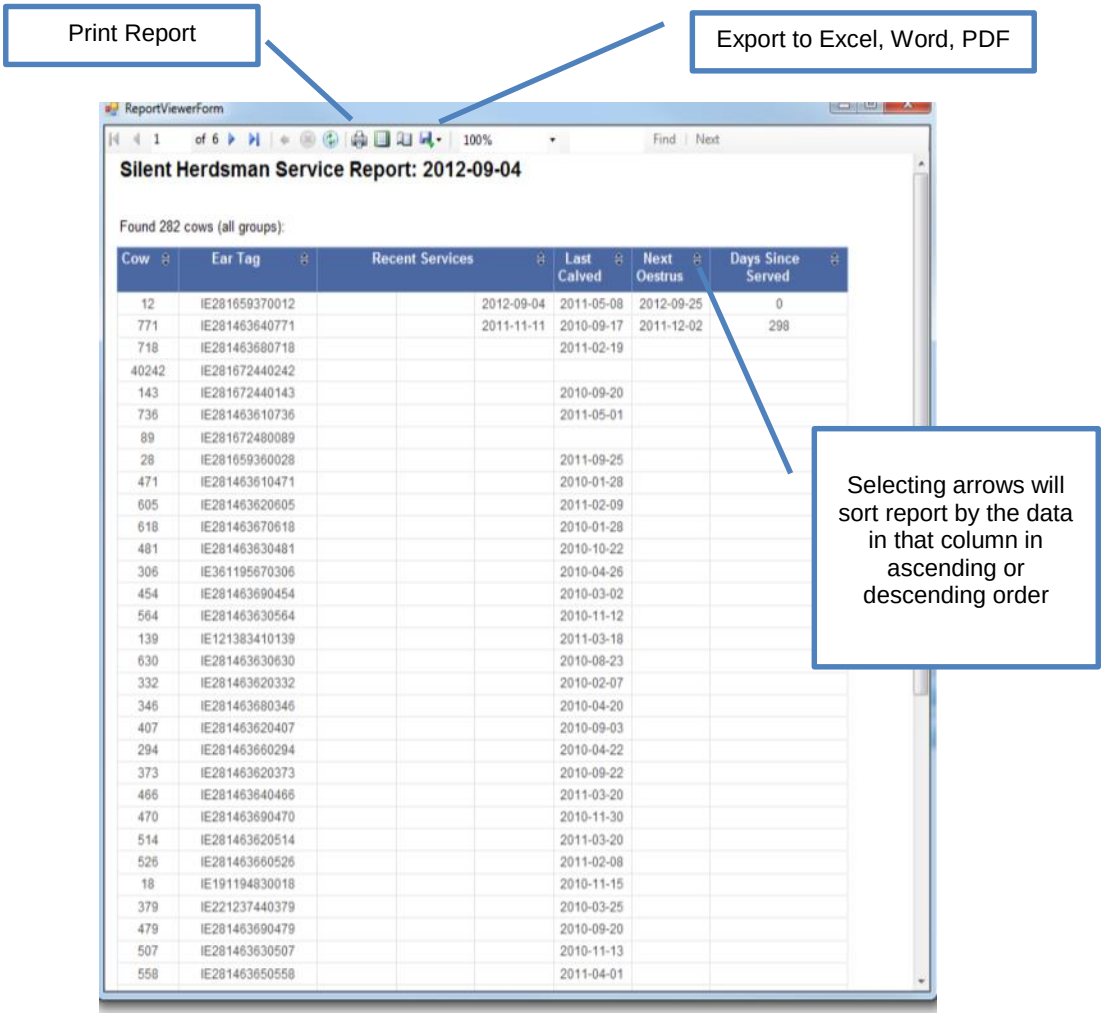
The user can select a from the following report types:

- Service history: last 3 services, calving date and predicted oestrus date
- Pregnancy Information: Pregnancy diagnosis date, last service data, parity and predicted calving date
- PD session: Lists animals last served 30-85 days ago and possibly pregnant
- Insemination session: Details cows currently flagged on heat.

- Collar and Cow Report: Lists the cows on farm and which if any collar is attached
- Cows not served in 30-85 days: Lists the cows which have not been annotated as served for more than 30 days since calving and less than 85 days since the last service.

The user can also choose which cow groups to include in the report by pressing the appropriate group button and toggling it to include or exclude the group. By default all groups are selected.

Press the 'Show' button to view the selected report.



Cow	Ear Tag	Recent Services		Last Calved	Next Oestrus	Days Since Served
12	IE281659370012		2012-09-04	2011-05-08	2012-09-25	0
771	IE281463640771		2011-11-11	2010-09-17	2011-12-02	298
718	IE281463680718			2011-02-19		
40242	IE281672440242					
143	IE281672440143			2010-09-20		
736	IE281463610736			2011-05-01		
89	IE281672480089					
28	IE281659360028			2011-09-25		
471	IE281463610471			2010-01-28		
605	IE281463620605			2011-02-09		
618	IE281463670618			2010-01-28		
481	IE281463630481			2010-10-22		
306	IE361195670306			2010-04-26		
454	IE281463690454			2010-03-02		
564	IE281463630564			2010-11-12		
139	IE121383410139			2011-03-18		
630	IE281463630630			2010-08-23		
332	IE281463620332			2010-02-07		
346	IE281463680346			2010-04-20		
407	IE281463620407			2010-09-03		
294	IE281463660294			2010-04-22		
373	IE281463620373			2010-09-22		
466	IE281463640466			2011-03-20		
470	IE281463690470			2010-11-30		
514	IE281463620514			2011-03-20		
526	IE281463660526			2011-02-08		
18	IE191194830018			2010-11-15		
379	IE221237440379			2010-03-25		
479	IE281463690479			2010-09-20		
507	IE281463630507			2010-11-13		
558	IE281463650558			2011-04-01		

Figure 57: Sample Service Report

12. System Functions

12.1. Online User Guide

This user guide is available on the computer. To access the user manual, go to the ‘About’ tab, which will give the display shown in Figure 58.

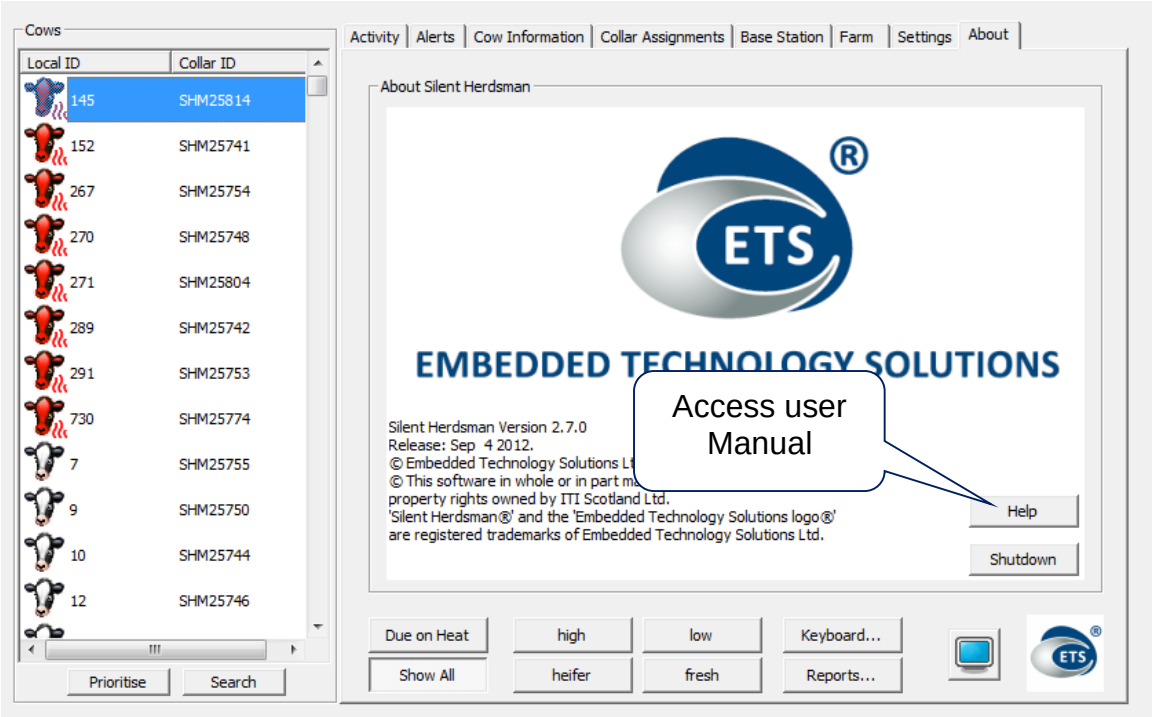


Figure 58 – Accessing the Online User Guide

12.2. System Power Down

If the electricity supply to the farm computer is to be removed, the computer must be shutdown first. This is done by going to the ‘About’ tab and pressing the ‘Shutdown’ button, see Figure 59, to go to the windows screen. From here, select the ‘Start’ menu and then Shutdown to power down the computer.

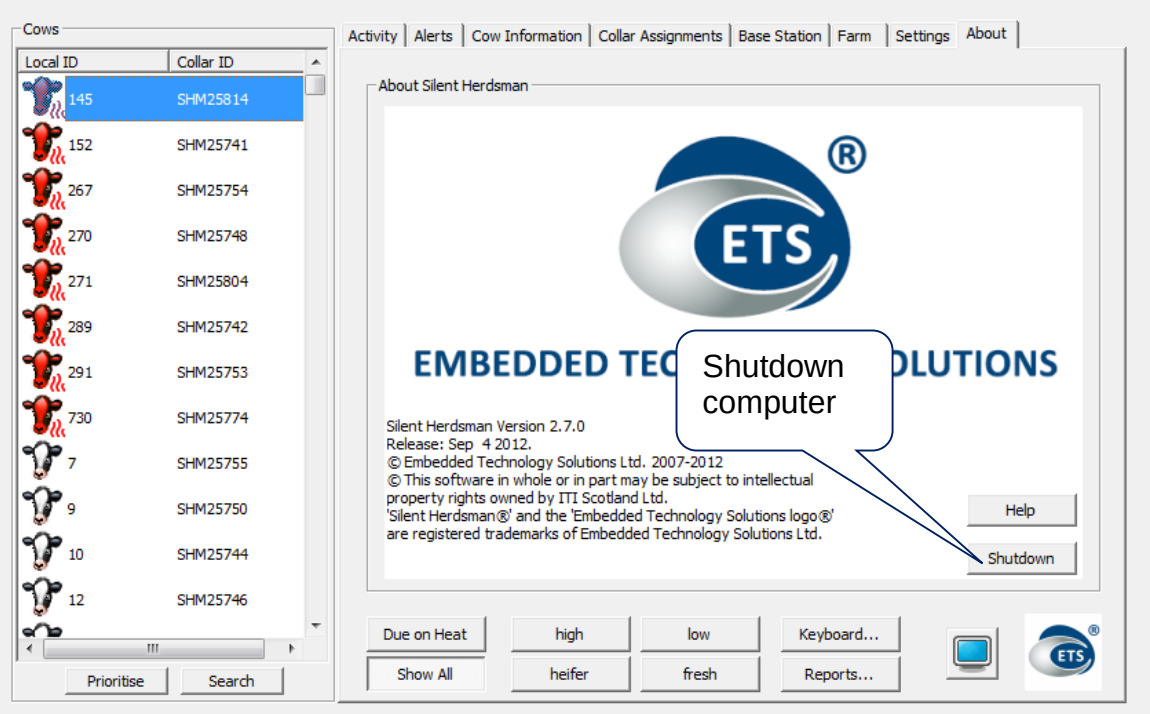


Figure 59 – Shutting down computer

12.3. Manual Starting of Silent Herdsman

Should the monitoring software be shutdown, double-click the Silent Herdsman logo on the desktop.

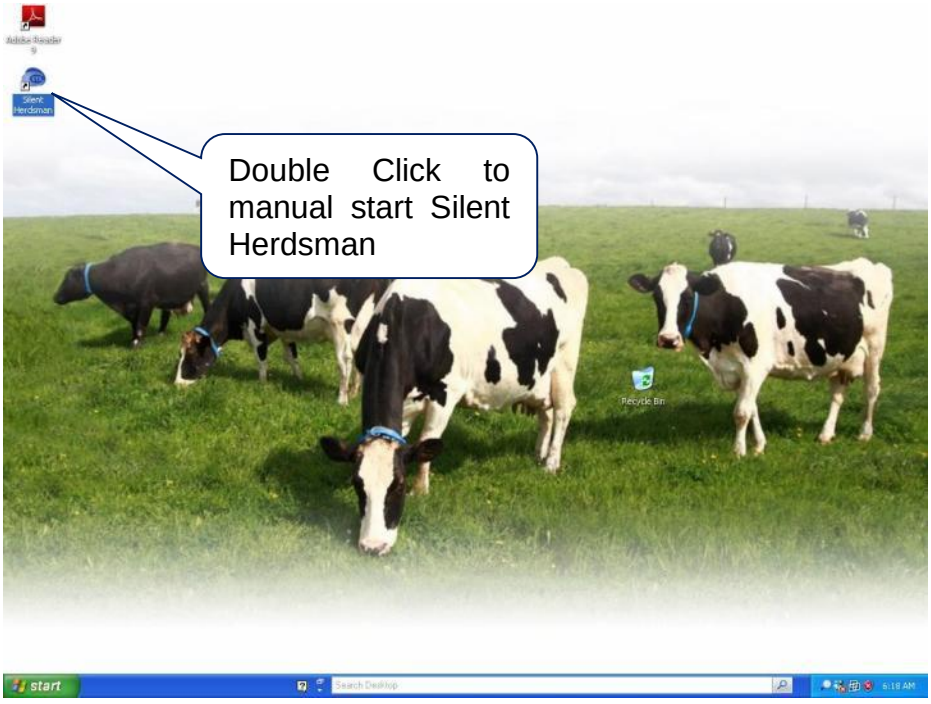


Figure 60 – Manual Starting of Silent Herdsman Monitoring Software

Appendix A - Base Stations

Base stations are used to bridge the communications between the collars on the cows and the Farm computer.

Base stations will automatically register with the computer when installed. The date of the last received communications from the collars is also displayed on this screen.

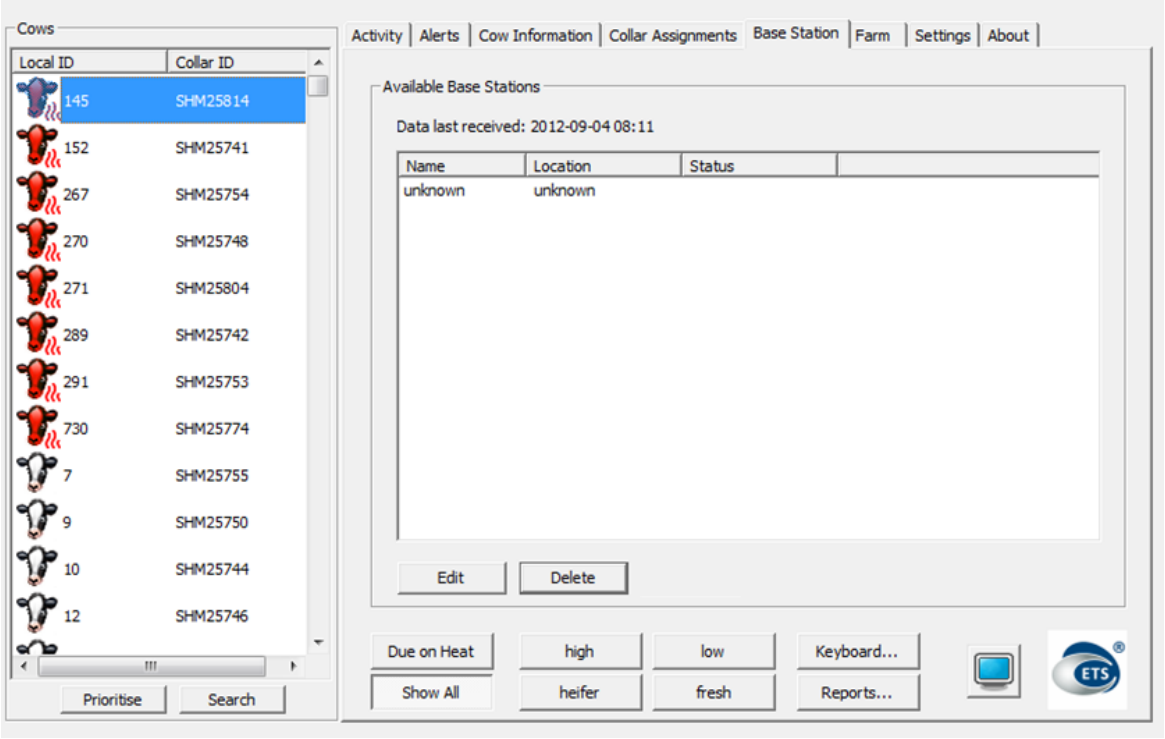


Figure 61 – Display of base station on farm

It is possible to edit the info for the base stations, with specific information, such as the location of the base station and a user friendly name of the base station.

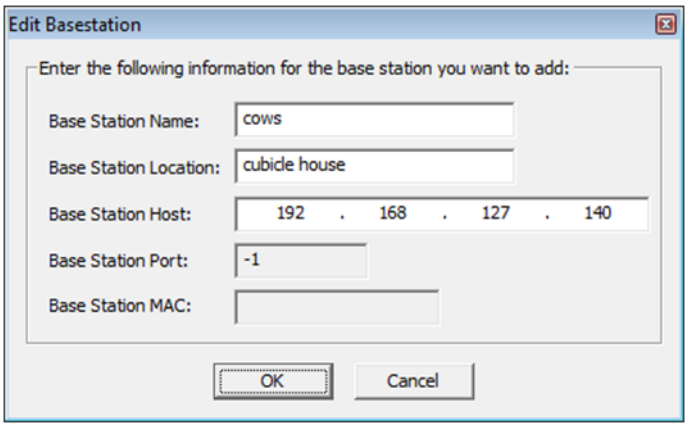


Figure 62 – Editing Base station info

To delete a base station from the list; select it from the list and press the ‘Delete’ button, similarly to test that communications is operationally between the management computer and the base station, select the base station and press the ‘Refresh’ button, the status should show that it is connected.

Appendix B – InterHerd Export Events

To export recent events from InterHerd and generate a valid file to import into the Silent Herdsman, select the “Data Links…” option from the File menu.

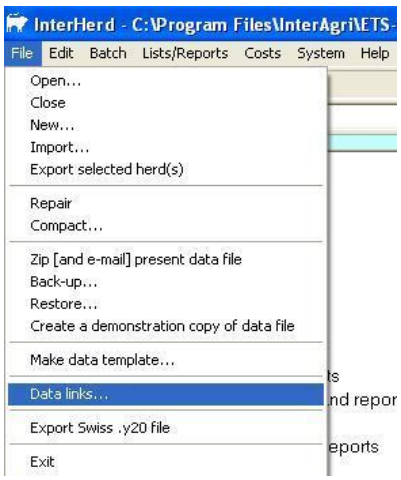


Figure 63 – InterHerd Data Links selection

Select Synchronise -> Export latest events

Figure 64 – InterHerd Export Latest Events

This loads the following dialogue box:

Figure 65 – InterHerd Export Date

Select the date from which events are to be exported and press “Begin”. At the prompt select the location to store the file with the exported data. The resultant file can be transferred to the Silent Herdsman computer.

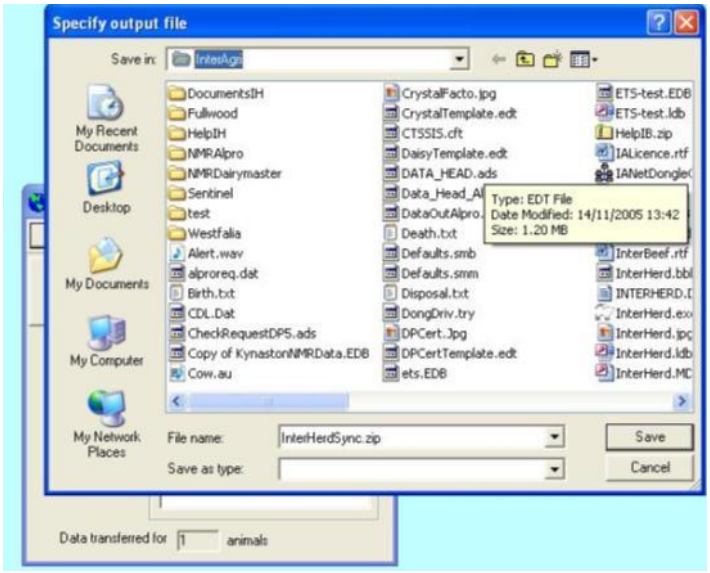


Figure 66 – InterHerd Export File Selection

Appendix C - Collar Upgrade

Introduction

The Silent Herdsman system is a scalable and upgradeable system that not only allows the upgrading of the software on the Silent Herdsman management computer but also upgrading of the software on the collars also.

If a newer version of software for the collars is available, this can be applied by using the upgrade capability within the Silent Herdsman user interface. This upgrader is access through the 'Collar Assignments' tab as shown in Figure 67 and selecting the 'Upgrade…' button.

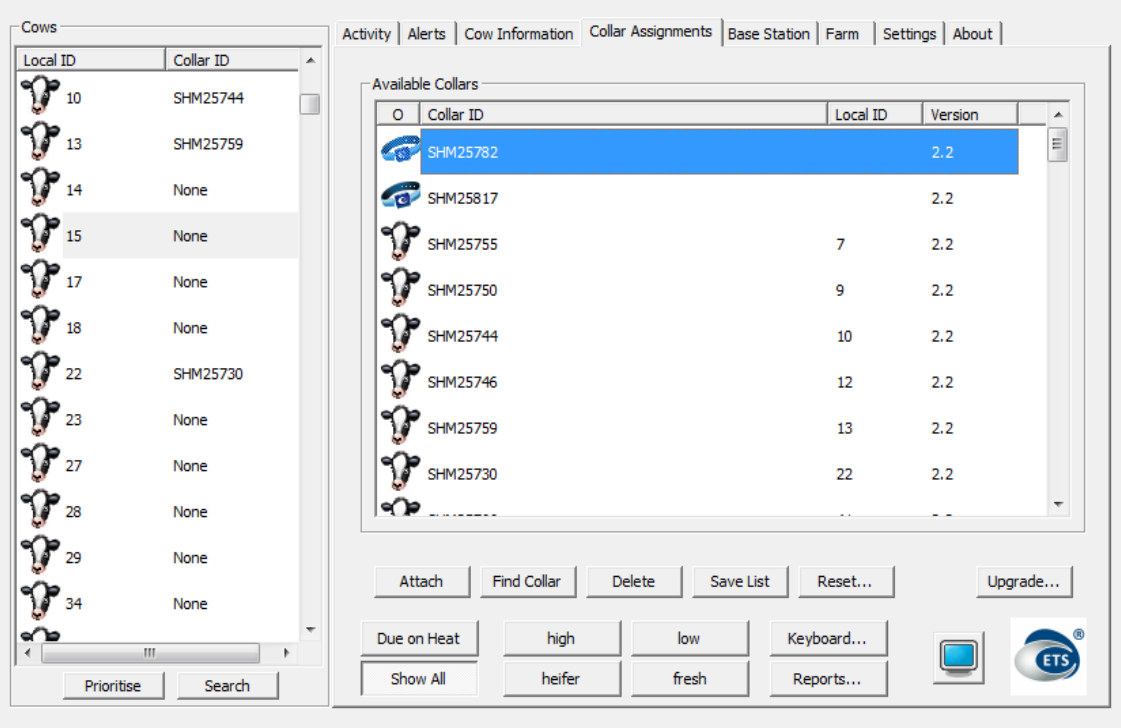


Figure 67 – Collar assignments Tab

When 'Upgrade…' is pressed a screen similar to Figure 68 is displayed which displays the version that the collars will be upgraded to.

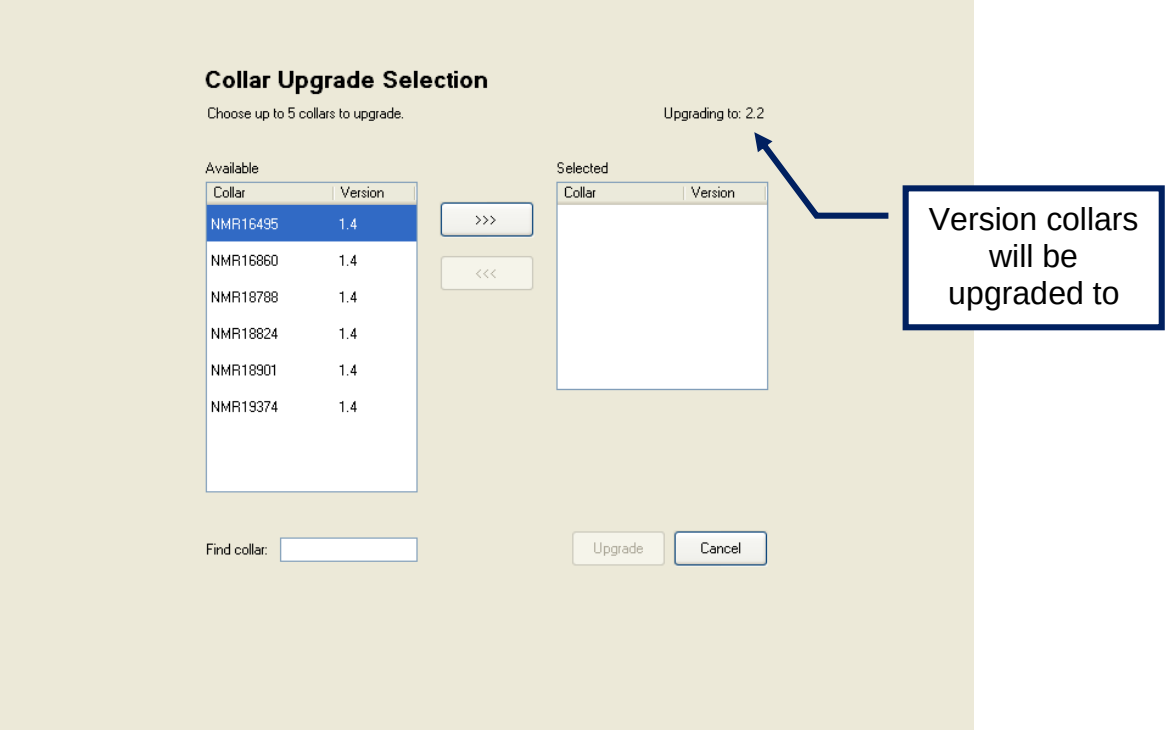


Figure 68 – Collar Upgrade Version

Upgrading Collars

Due to the large amount of data transferred during upgrading between the collar and the management computer, a *maximum of 5 collars* can be upgraded simultaneously to ensure that oestrus detection continues normally.

Collars must be *detached from cows* before they are available in the upgrade list and during upgrade the collars must remain within *approximately 5 meters of the base station* to ensure good communications.

As an estimate, upgrading 5 collars can take from 3 – 24 hours, depending on the number of collars on farm and distance from base station.

To pick collars for upgrading, select the collar from the Available collars list and press the '>>>' button. This will transfer the collar to the Selected collar list.

If an error is made in the selection, select the collar in error from the Selected list and press the '<<<' button to return it to the Available collars.

To find a specific collar from a large list, type the collar number into the 'Find Collar' box and the Available collar list will be limited to the collars that match the value entered.

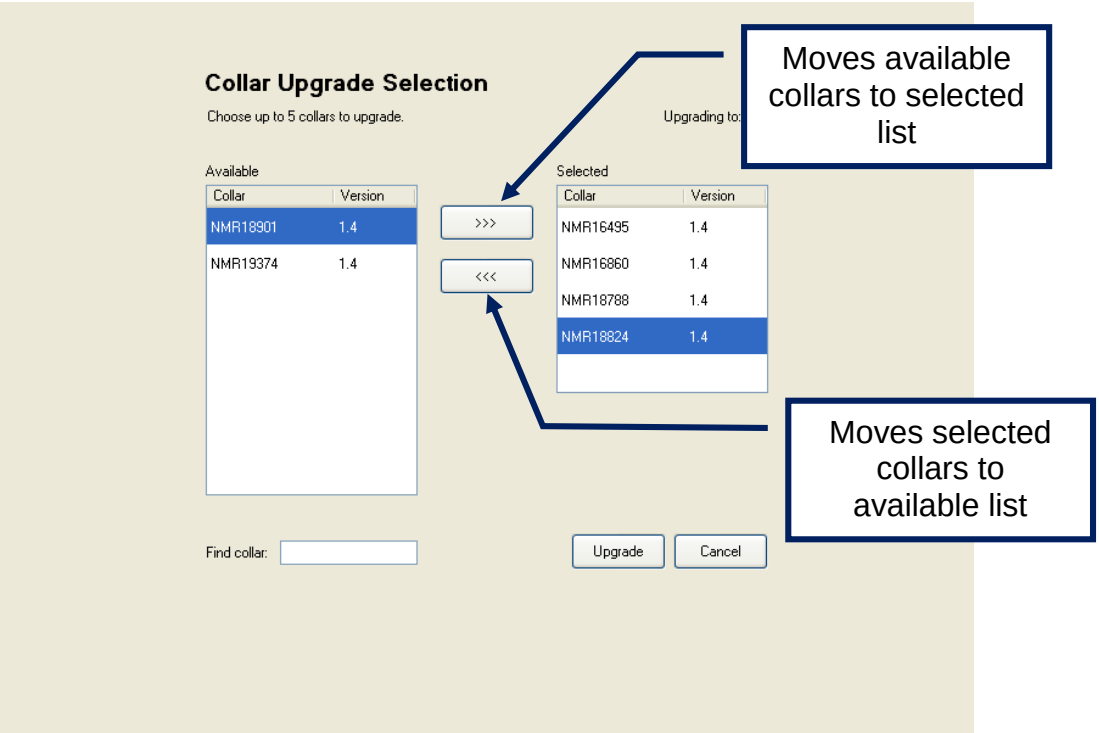


Figure 69 – Selecting collars are upgrading

When the collars have been selected for upgrade, press the 'Upgrade' button to begin the upgrade process. A message box will appear with a reminder to keep the collars near the base station. Pressing 'OK' will display the collar upgrade status window, Figure 70.

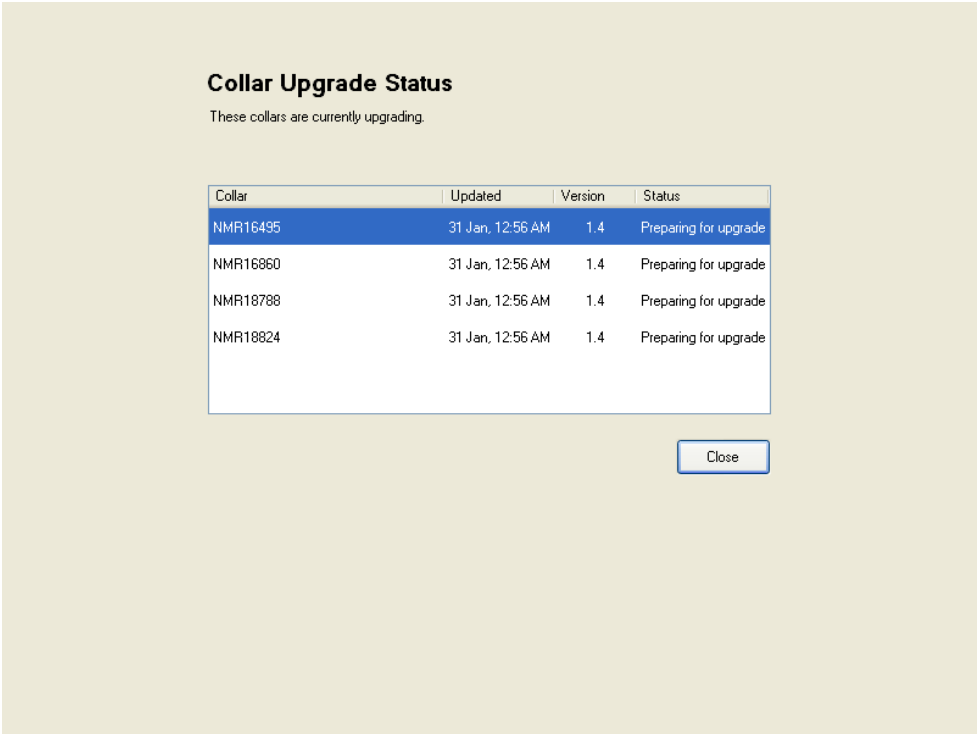


Figure 70 – Collar Upgrade Status

Pressing ‘Close’ will close the status window and return to the normal Silent Herdsman screen to enable normal operation of the system. The collar upgrades will continue in the background.

Pressing the ‘Upgrade…’ button in the ‘Collar Assignments’ tab will return to the collar upgrade status window while upgrades are in progress.

When the upgrade has finished successfully the status window will show ‘Completed’ against the collar, see Figure 71 and the new version number. The collars are now ready for attaching to a cow. Pressing ‘Continue’ will close the status window and return to the collar selection window for upgrading further collars

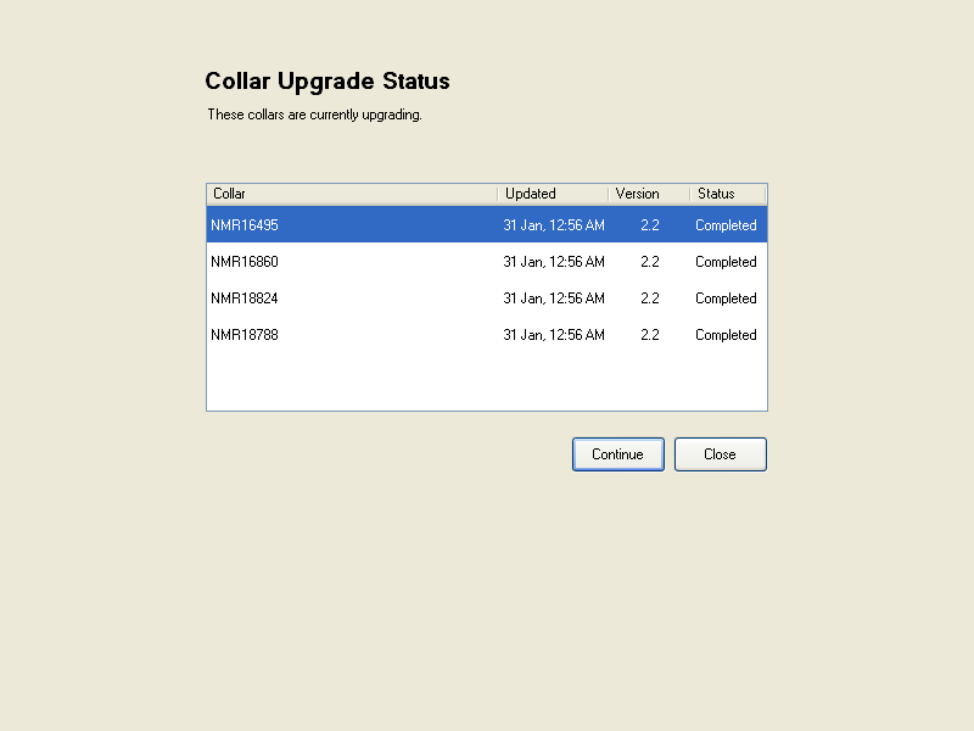


Figure 71 – Collar Upgrade Completed

If an upgrade fails to complete a screen similar to Figure 72 is displayed showing the collar that has failed to complete. Selecting ‘Continue’ will return to the collar selection window.

The failed collar can be re-selected and the upgrade tried again, if the issue continues, contact your supplier.

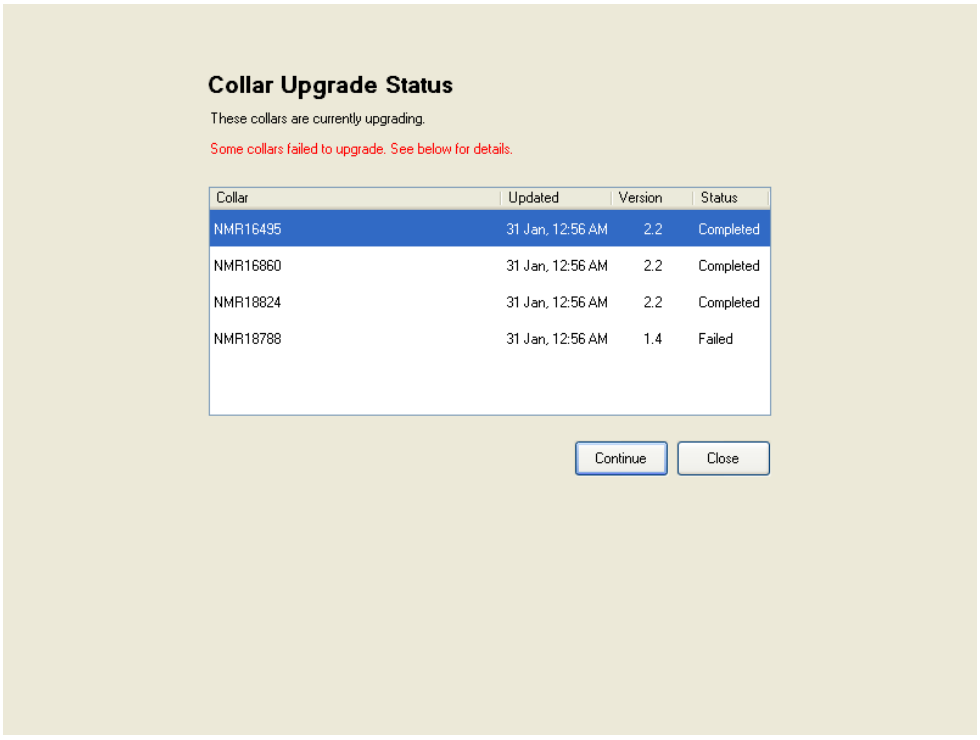


Figure 72 – Collar Upgrade Failed

Appendix D - Regulatory Information

Declaration of Conformance

EC Declaration of Conformity to R&TTE Directive 1999/5/EC

Manufacturer : Embedded Technology Solutions Ltd,
Ladywell Business Center,
Glasgow,
G4 0UW

Product / Apparatus : Silent Herdsman
Type Number : ETSFANSB
Variants include : All country variations

Declaration

I declare that above product is in conformity with the essential requirements and other relevant requirements of the R&TTE Directive (1999/5/EC). The product is in conformity with the following standards and/or other normative documents:

Article 3.1a: (Standard(s)) used to show compliance with LVD, 2006/95/EC: EN60950-1;2006

Article 3.1b: (Standard(s)) used to show compliance with EMC Directive, 2004/108/EC: EN301 489-17 V2.1.1, EN301 489-1 V1.8.1

Article 3.2: Standard(s) used to show compliance: EN300 328 V1.7.1 (2006-10)

Signature: .....

Name: Ivan Andonovic

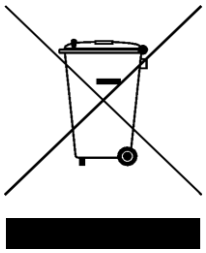
Title: Chief Technology Officer

Date: 29th August 2011

Waste Electric and Electronic Equipment

User Information for Consumer Products Covered by EU Directive 2002/96/EC on Waste Electric and Electronic Equipment (WEEE)

This document contains important information for users with regards to the proper disposal and recycling of Embedded Technology Solutions products. Consumers are required to comply with this notice for all electronic products bearing the following symbol:



European Directive 2002/96/EC requires that the equipment bearing this symbol on the product and/or its packaging must not be disposed of with unsorted municipal waste. The symbol indicates that this product should be disposed of separately from regular household waste streams. It is your responsibility to dispose of this and other electric and electronic equipment via designated collection facilities appointed by the government or local authorities. Correct disposal and recycling will help prevent potential negative consequences to the environment and human health. For more detailed information about the disposal of your old equipment, please contact your local authorities, waste disposal service, or supplier of the product.

FCC warning statement:

- This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference thatmay cause undesired operation.

- This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
- Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment