Lonestar® online software version 4.912 guide

Issue/Version	Date	Author	Details
OW-007250-TM	13/11/2014	Céline Lainé	The original
AAA	18/08/2016	Céline Lainé	Reformat, assign new part number.
AAB	06/09/2016	Andrew Pauza	Edits for clarity, suggestions of where some extra work is needed, added heading level2
AAC	16/11/2016	Céline Lainé	Changed title. Added links to configuration editor, calibration procedure and method integration documents.

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Notices

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	This symbol is used to highlight a section explaining particularly important safety considerations
	This warning label indicates danger of electrical shock hazard
	This warning label indicates parts of the product that will become hot during use. Please take care.

Introduction

This document details the Lonestar® online software version 4.912 used with an ATLAS™ sampling module assembly and ATLAS™ split flow box.

For further details on how to install the Lonestar® system, please consult the documentation on the Owlstone® website.

Set up and Components

Please ensure that you are familiar with the hardware naming before using the Lonestar® system.

Figure 1 shows the final setup of the Lonestar® when used with an ATLAS™ sampling system.

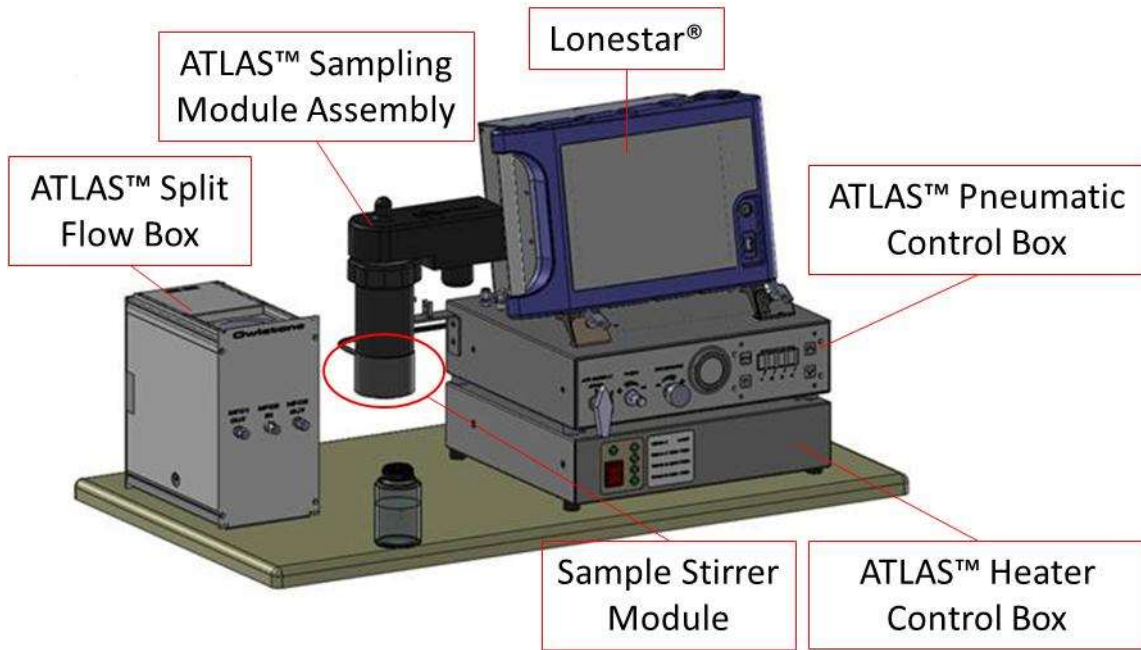Figure 2 details the ATLAS™ sampling module assembly.
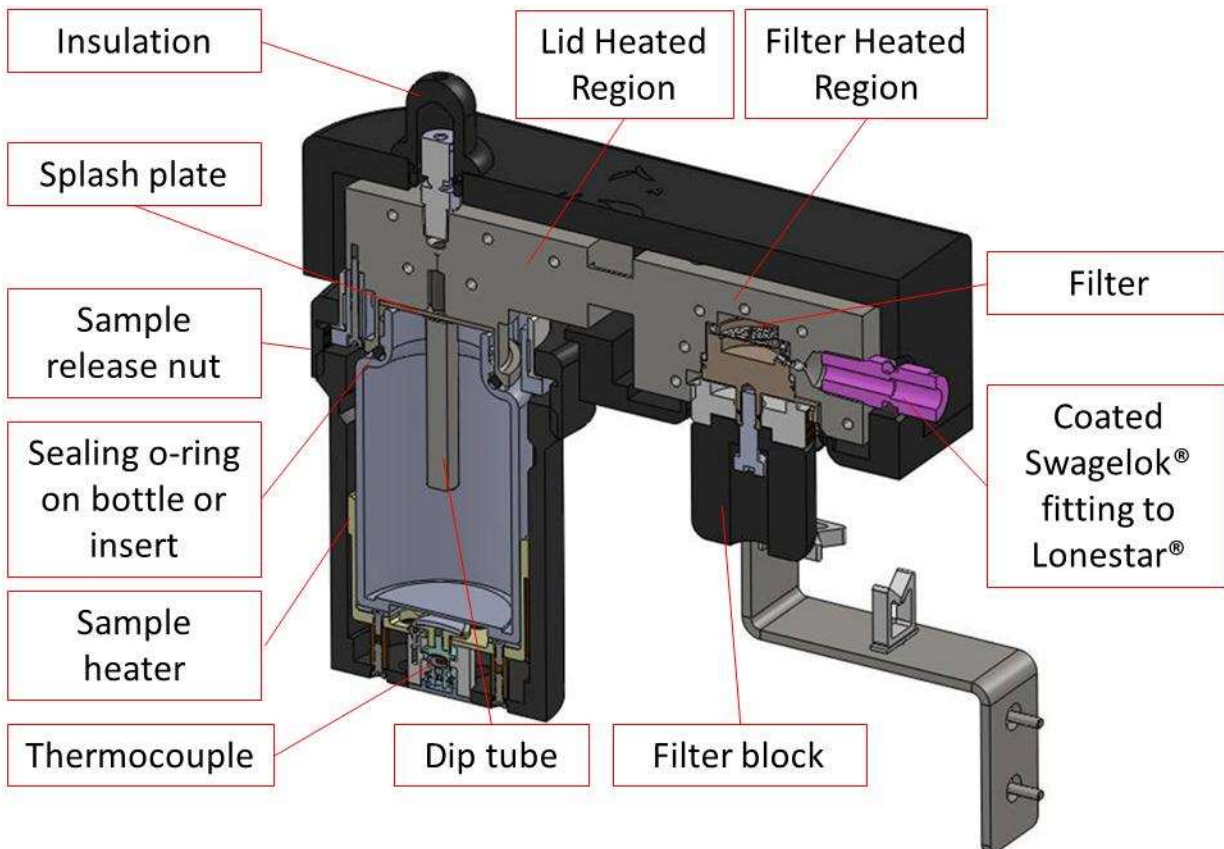
Figure 1 Lonestar® and ATLAS™ components

Figure 2 Diagram of components of the ATLAS™ Sampling Module Assembly

Lonestar® software start

To open the Owlstone® Lonestar® software click on the Lonestar® icon on the desktop (Figure 3).

Figure 3: Owlstone® Lonestar® desktop.

Lonestar® Software Home screen

The Lonestar® software opens on the end user mode screen presented in Figure 4. This screen displays the analyser screen (Figure 4) used when the configuration of the final method has been loaded to the instrument.

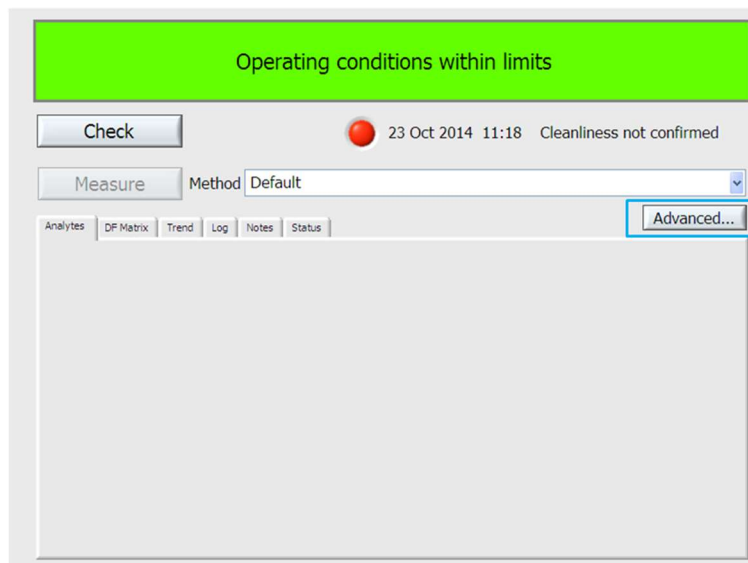To access to the advanced screen for method development, use the button Advanced.

**Figure 4: Lonestar® software home screen.**

Lonestar® Software Navigation Bar

Pressing the home screen Advanced button makes the Status screen appear (Figure 5). In this mode, the general Lonestar® software navigation bar can also be seen. The navigation bar gives access to all the Lonestar® control screens as well as providing some of the basic controls using the three subsections: A- Menu Bar, B) Tab selection and C) System control.
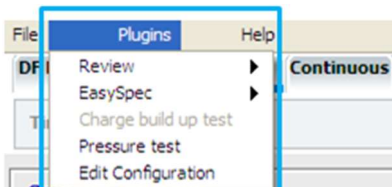

Figure 5: Status screen obtained from the Advanced button, showing the main Lonestar® software navigation bar and the three subsections.

A - Menu bar:
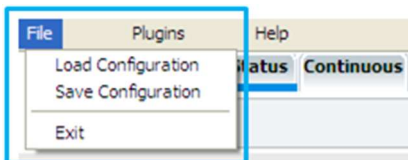
• Load the created configuration

• Save the current configuration

• Exit the Lonestar® software

• Review collected DF Matrix / Process files

• EasySpec Rule builder/ application builder tools to create configuration

• Pressure test. For more information please consult the pressure testing documentation:http://support.owlstonenanotech.com/hc/en-us/articles/212367446-Pressure-testing-of-a-Lonestar-3-0-with-ATLAS-2-x

• Edit current configuration. For more information please consult the Lonestar® online software configuration editor documentation:
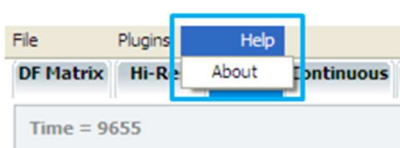
• Lonestar® software version, serial number and FAIMS chip ID information

B - Tab Selection:

Used to select the System Information that needs to be displayed either DF Matrix, Hi-Res, Status, Continuous, Analyser or Settings. Also used to bring up the on-screen keyboard popup for file saving and other text changes if a USB keyboard is not available. Each tab is detailed in the remaining of this document.

C - System Control:

Used to start and stop monitoring the matrix scanning, to change system flow rate and pressure, to switch purge on/off if the purge has been installed (not shown here).

Lonestar® Software Status Screen

The Status screen (Figure 6) provides feedback on the Lonestar® system and the process that it is monitoring.

It is divided in two sections:

On the left hand side, simple lines present a quick guide to system stability and pass (green) or fail (red) against a set of limits.

On the right hand side, two dual axis graphs allow a more detailed analysis of up to four of the key system variables at any one time. System variable are selectable from the pull down menus.
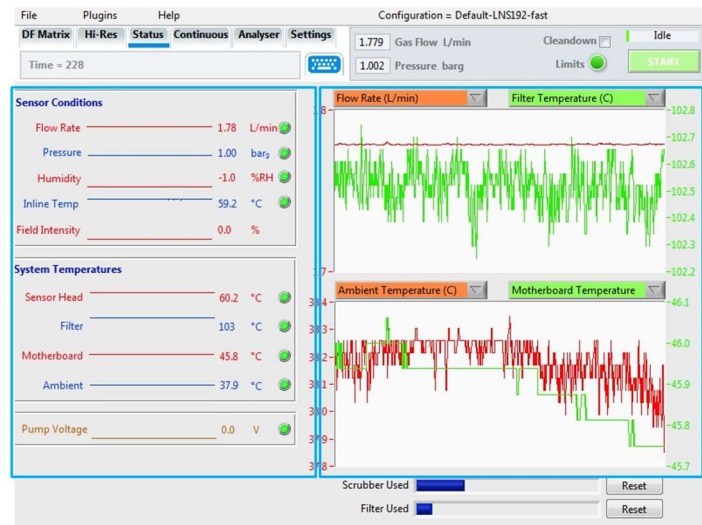

Figure 6: Status screen.

Lonestar® Software DF Matrix Screen

The DF (Dispersion Field) Matrix screen (Figure 7) is designed to allow a more detailed look at the chemical signature of the gas sample by continually building up DF Matrices. It also lets the user to see both positive (blue background) and negative (red background) ion mode spectra at the same time.

A DF Matrix is a collection of CV (compensation voltage) scans performed at a number of different field intensity settings to build up a characteristic chemical fingerprint of the sample.
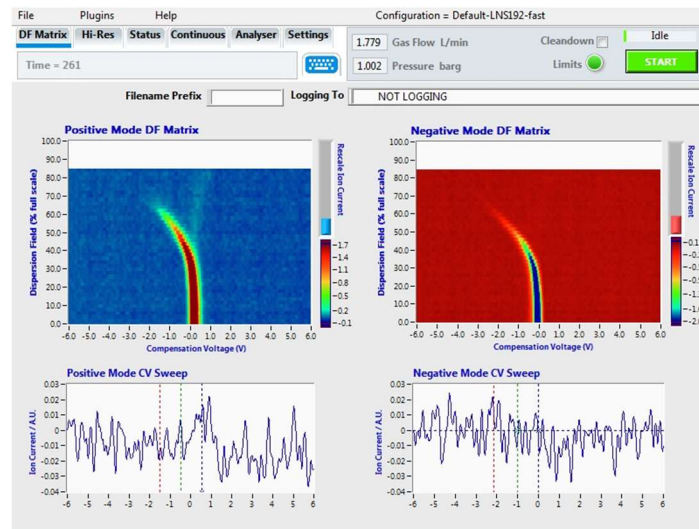
Figure 7: DF Matrix screen.

Lonestar® Software Settings Screen

Selecting the Settings screen (Figure 8) displays the settings parameters, including DF matrix settings, instrument set-up, ATLAS™ Sampling Module set-up and Split Flow Box (SFB) settings as shown below:
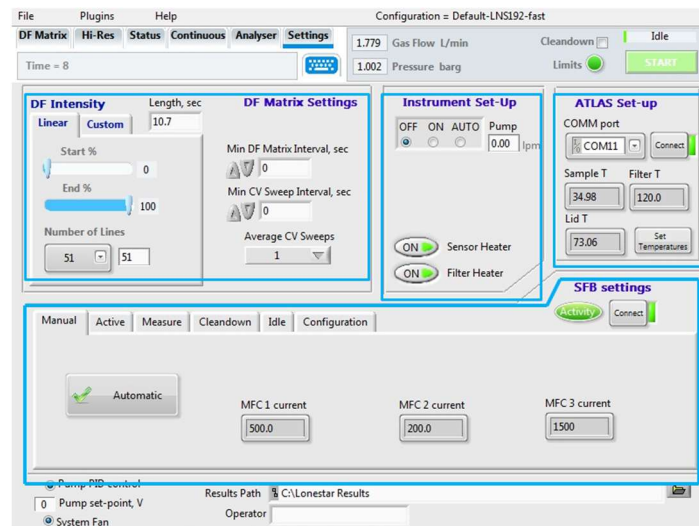

Figure 8: Settings screen.

DF Intensity and DF Matrix

A DF (Dispersion Field) Matrix provides a chemical fingerprint of the gas being analysed by building up a set of CV (Compensation Voltage) sweeps at different DF intensities. The DF Intensity can be set for a linear (Figure 9) or custom (Figure 10) configuration to alter the way DF Matrices are performed, both in DF Matrix and Analyser modes.
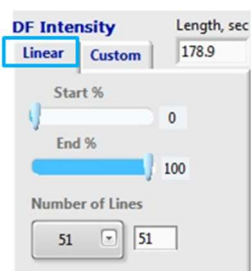
Figure 9: Linear DF Intensity configuration

Figure 10: Custom DF Intensity configuration

The linear DF Intensity sets the start and end points for the DF Intensity along with the number of data lines to collect. The system will then collect CV sweeps at even intervals between the start and end DF Intensity. For a full DF scan, the start point is set to 0%, end point to 100%, with 51 lines.
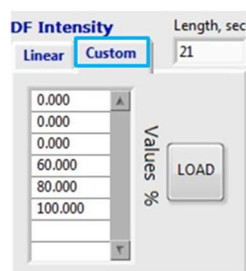
The custom DF Intensity is used to create a non-linear DF Matrix. When a DF Matrix is started, the system will step through each DF Intensity entered into the table from top to bottom. Right clicking on the table will produce a number of additional options, Empty Table, Insert Row Before, and Delete Row. If the LOAD button is pressed, values will be imported from a selected text file. Typically, Microsoft Excel is used to create a table of DF Intensities for ease then the file is saved as a text file.

Instrument set-up

Controls in this section are for the gas purge if fitted, a pump if one is used and to turn the filter and sensor heaters on/off.

ATLAS set-up

The Lonestar® ATLAS™ sampling module set-up section manages the three sample module region temperatures (Sample, Lid and Filter).

The SFB settings

The SFB (Split Flow Box) section is to allow us to set and communicate with the mass flow controllers located in the split flow box. The different tabs allow configuring the split flow box for measure, cleandown and idle modes. Once configured, those working modes can be checked with Manual and Active tabs. All tabs are detailed below.

Configuration tab
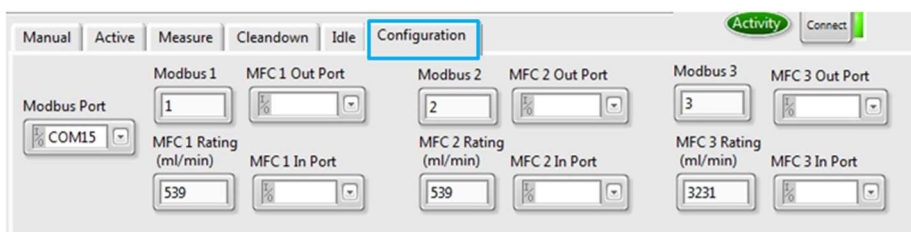
The Configuration tab is completed as soon as the ATLAS™ split flow box is installed.

The Modbus (COM) Port is automatically set, but if needed it can be selected from the drop-down menu. The Modbus values should be set with Modbus 1 value to 1, Modbus 2 value to 2 and Modbus 3 value to 3.

MFC 1 is the sample mass flow controller and has a calibration factor of 539 mL/min to compensate for differences between MFC gas calibration done at 0˚C and instrument calibration done at 21.1˚C.

MFC 2 is the split flow mass flow controller and also has a calibration factor (difference between 0˚C and 21.1˚C) of 539 mL/min.

MFC 3 is the makeup flow mass flow controller and typically has a calibration factor of 3231 mL/min.

The MFCx Out Port and MFCx In Port boxes are to allow the user to connect analogue mass flow controllers via an external NI card. Please contact the Owlstone® support department if you need to use this functionality.

Manual tab

The Manual tab is used to allow manual setting of the mass flow values. Clicking on the Automatic button changes the Manual tab to manual control as shown below:
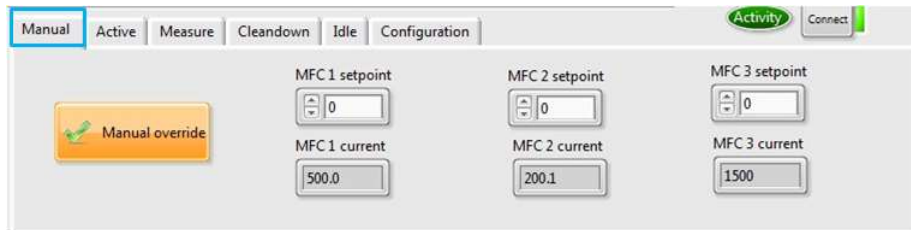
When a flow is set in mL/min, e.g. MFC1 setpoint, the current value, e.g. MFC1 current, should match the value that has been set.

Use the Manual override button to return to Automatic control, when all mass flow controllers have their setpoint set.

Measure tab
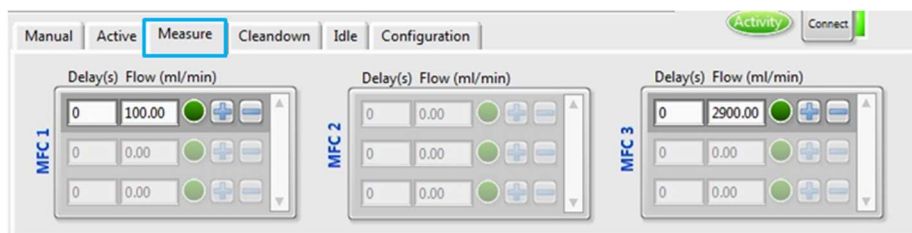
The Measure tab is used for analysing samples.

The flow values of the three mass flow controllers are set in the Flow (mL/min) box.

Delay corresponds to the time in seconds when the mass flow controller starts. 0 second when no delay is required. Time delay can be used for headspace pre-concentration, e.g. 300 seconds, before the mass flow controller starts to flush the headspace into the Lonestar® core. Typically, the makeup flow is required at all times even if headspace pre-concentration is required. So a delay of 0 second and the desired makeup flow are required.

Cleandown tab
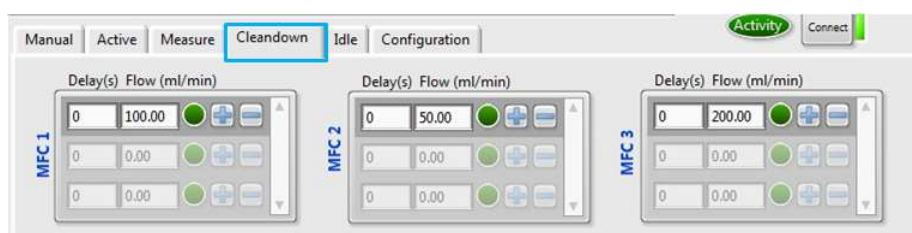
These flows are to be used to determine the cleanliness of the sample flow path. Typically the delays are all set to 0 second as no delay is timed to allow the sample headspace to pre-concentrate. These flows are standard conditions for the Lonestar® and can be used for all methods run on the system.
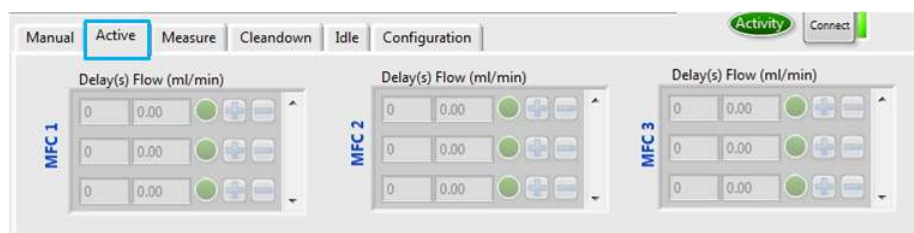
Idle tab
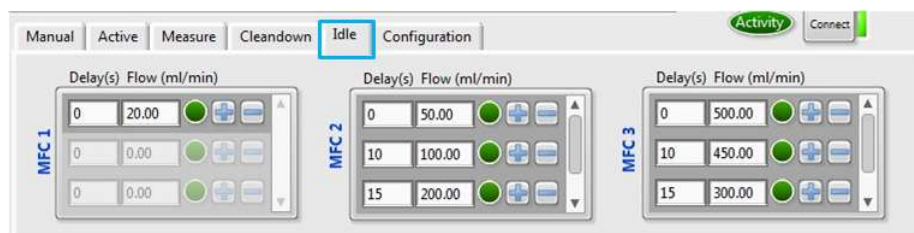
These flows are to be used to vent the pressure from the Lonestar®, when the sample system is open to change the sample.

Please note that it is advised to minimise the time the Lonestar® is left in idle mode to ensure the flowpath is kept clean.

Active tab

The Active tab is used to check the flows being used in real time, when the Lonestar® system runs from the Measure, Cleandown or Idle mode.

Lonestar® Software Hi-Res Screen

The Hi-Res (High Resolution) screen (Figure 11) is used when only one of the positive or negative modes is required by the detection method, but at twice the resolution. If the negative mode DF matrix is run in high resolution, two negative modes will appear, as shown in Figure 11.
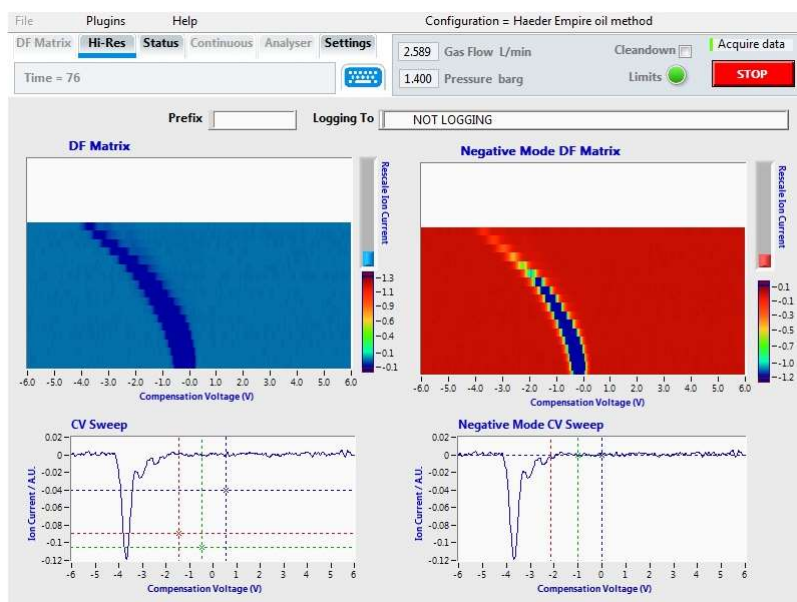
Figure 11: Hi-Res screen showing 2 positive mode DF matrices.

To run this mode, please contact the Owlstone® support department for more information, by sending an online request:

http://support.owlstonenanotech.com/hc/en-us/categories/201660806-Lonestar-and-FAIMS-CORE-PAD-

Lonestar® Software Continuous Screen

The Continuous screen (

Figure **12**) provides process monitoring functionality with the ability to analyse the gas flow at a set DF (Field Intensity) whilst Monitoring variations. The continuous screen content is divided into three sections below:

A - Current CV sweep – 1 D spectra showing the last CV sweep and a button to turn Monitor and Train on/off.

B - Process history – 2 D spectra showing history of last 200 CV sweeps.

C - System information – Quick links to specific system data over time.

D – Field intensity selection – slider and arrows to select the DF value in use.

Monitor and Train buttons

These buttons are used to monitor a compound that is expected to be present.

The Train button is used to set the threshold peak height. Using the Train button in section A changes the plot in section C – System information from Ion Current Row, A.U. to Ion Current Deviation, A.U.

The Monitor button is then used to compare the achieved peak height with the trained peak height previously set.

If the Ion Current Deviation, A.U. in section C exceeds a fixed threshold, the Alarm State bar located on top of section C changes to yellow. If the Ion Current Deviation, A.U. exceeds a higher threshold, the Alarm State bar changes to red.
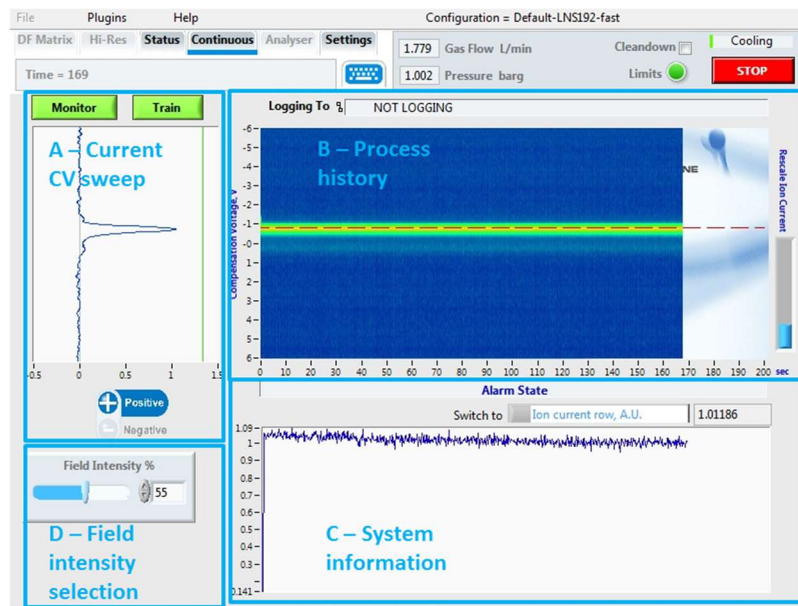
Figure 12: Continuous screen.

Lonestar® Software Analyser Mode Screen

The Analyser screen (Figure 13) is accessed by selecting the Analyser tab from Advanced mode, and is also the home screen when the Lonestar® software is started. It is used to run samples using methods loaded onto the instrument.

For more information on how to generate detection methods using the Lonestar® system, please consult the documentation:

OW-008489-TC Lonestar calibration method procedure - being updated

For more information on how to integrate a method onto the Lonestar®, please consult the documentation:

OW-007295-TM- Lonestar configuration procedure – being updated

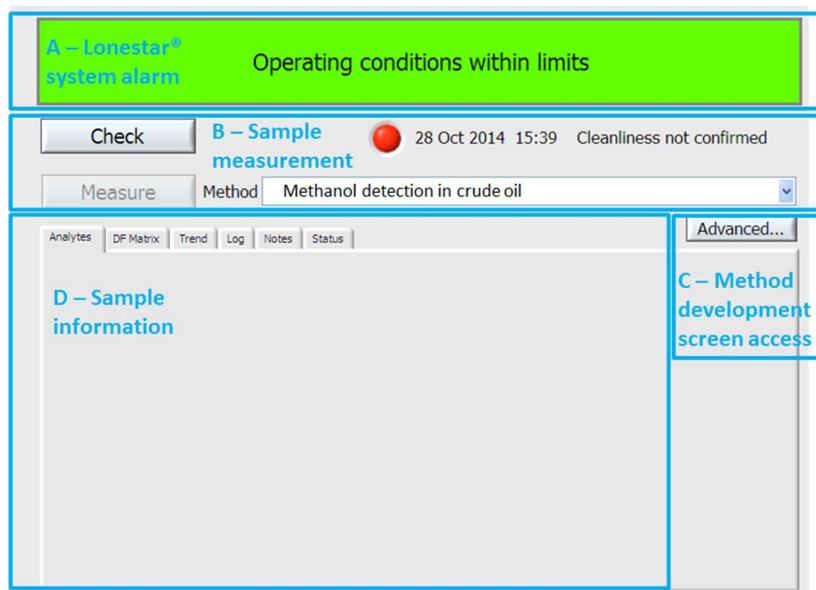A configuration file may contain many methods which can be selected in Analyser mode.

Figure 13: Analyser mode screen.

The Analyser screen is divided in three sections:

A – Lonestar® system alarm - Top bar showing if operating conditions are within the external parameters limits set in the Lonestar® configuration method (green background) or not within the limits (red background).

B – Sample measurement:

1. Check button - system cleanliness checking with indications on date and result of the last system cleanliness check. When the cleanliness check pass, the light turns green and the Measure button becomes active. When the cleanliness check fails, the light turns red and the Measure button stays inactive.

2. Measure button - sample running using the method named in the box to the right (i.e. Methanol detection in crude oil). The Measure button only becomes active if the system cleanliness check has passed.

C – Advanced button – access to the advanced Lonestar® software screens for method development.

D – Sample information – Live and recorded information on samples. Details on each tab are presented below:

Analytes tab

After a measurement, the analyte result is displayed in the Analytes tab (Figure 14). Generally, the detected analyte result is presented as the analyte name with a green or red alarm depending on the set threshold (green for below threshold, red above), measurement date and time and detected concentration.

Figure 14: Analyser mode screen analytes tab.

DF Matrix Tab

During a measurement, it is possible to follow live data collection using the DF Matrix tab (Figure 15).
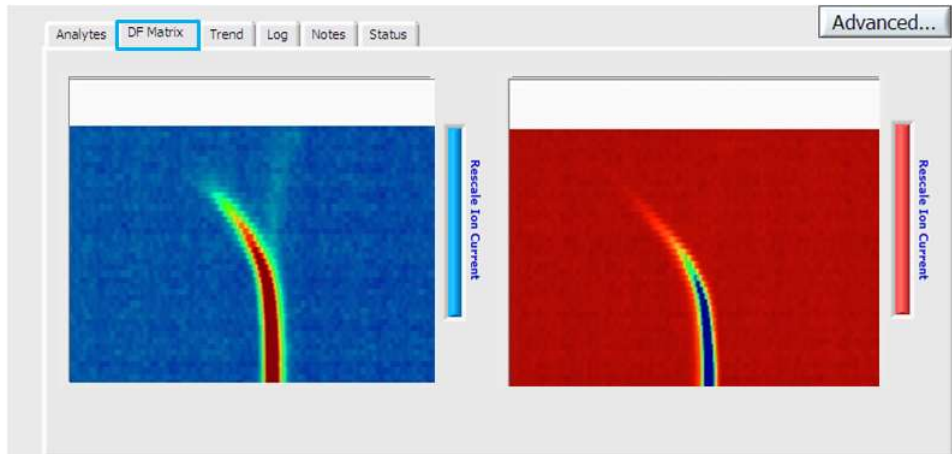

Figure 15: Analyser mode screen DF Matrix tab.

Trend tab

This trend tab gives history on previous analyte detection.

Log tab

The log tab records all samples that have been run on the Lonestar®.

Notes tab

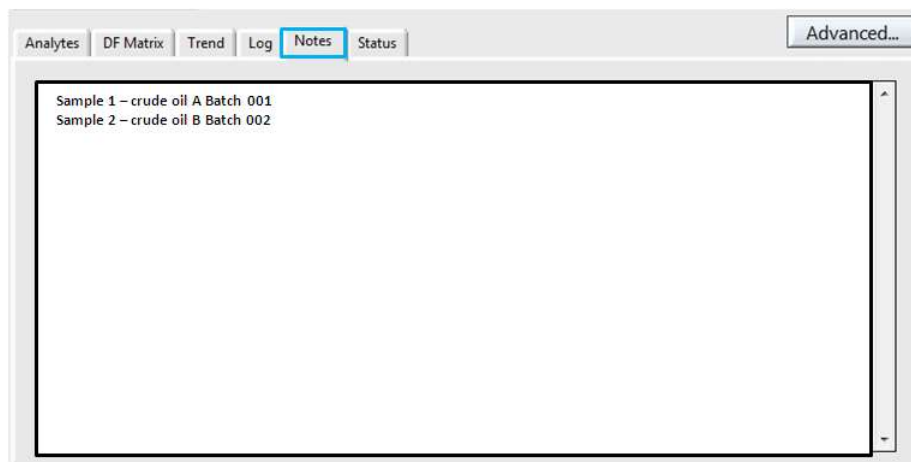The notes tab (Figure 16) can be used to write additional notes on measured samples.

Figure 16: Analyser mode screen Notes tab.

Status tab

The Status tab (Figure 17) provides feedback on the Lonestar® parameters while it is monitoring. If one of the parameters doesn't operate within the method limits, a warning message appears on the right hand side.
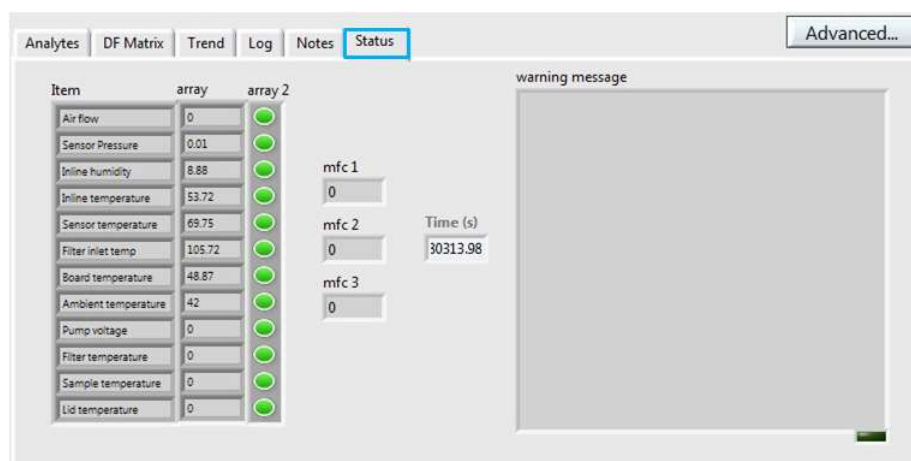
Figure 17: Analyser mode screen Status tab.

About Owlstone®

Owlstone® develops and commercializes innovative new technologies to address the critical need for compact, dependable and cost-effective chemical and biological detection solutions for a wide range of markets.

Owlstone® was formed through the recognition of the opportunities created by the application of micro- and nano- technology to develop improved sensing solutions.

Owlstone® is focused on the innovation of detection technologies to address unmet needs, developing solutions that are flexible enough to target a range of markets with the potential for growth by enabling new application opportunities.

From homeland security to home safety, Owlstone® is working with leading manufacturers and integrators across a range of markets to develop products incorporating our microchip chemical sensing solution.

Owlstone® is headquartered in the United States and has laboratory facilities in the United Kingdom. Owlstone® Ltd was founded in 2003 with a seed investment of two million dollars from Advance Nanotech, Inc., a New York based company specializing in the investment in and commercialization of nanotechnologies.