Guide to DSI's

Buxco Product Solutions

Engineering Solutions for Bio-Discovery

DSI™

Better Data. Better Science.

Table of Contents

About FinePointe Systems

DSI's Buxco FinePointe* systems are a new class of research products—software and hardware—that focus on collecting data and reporting results in the fastest, easiest, and most reliable manner.

Clean and Compact

FinePointe systems are highly integrated, space efficient, and easy to assemble. The new hardware designs offer better control at the subject apparatus (or subject "site").

Simple, yet Powerful

FinePointe systems set new standards for ease of operation. Each collection site includes a console that provides you with real time data collection status and real time data collection control.

Fast Results

- **Instant Reports -** Wizards ensure that setup of reports is easy and fast. At the end of an experiment you are presented with a report you can view, use in a Microsoft® Word® document, or export to another format such as Excel®, SPSS™, or GraphPad Prism™.

Flexible Data Handling

- You can view your complete data set (signals, tables, graphs) during acquisition or post acquisition.

- After data collection is completed, measurement periods can be adjusted to capture a missed response or to focus on a region of interest. These measurement periods can also be added and removed as needed.

- Outliers can be rejected from analysis.

GLP Friendly Features

- Fully supports the demanding requirements of 21 CFR Part 11 studies, with digital signatures, audit trails, and a special report that contains the raw data. Safeguards such as user permission restrictions and cyclical redundancy checks prevent unauthorized data manipulation.

For a detailed description of the GLP features of the FinePointe software, see page 31.

For a detailed description of the FinePointe software, see page 25.

* FinePointe™ is a trademark of DSI.

FinePointe software and FinePointe hardware were made for each other. Pairing them leverages the strengths of each —easiest operation, highest throughput, and maximum efficiency overall.

Hardware
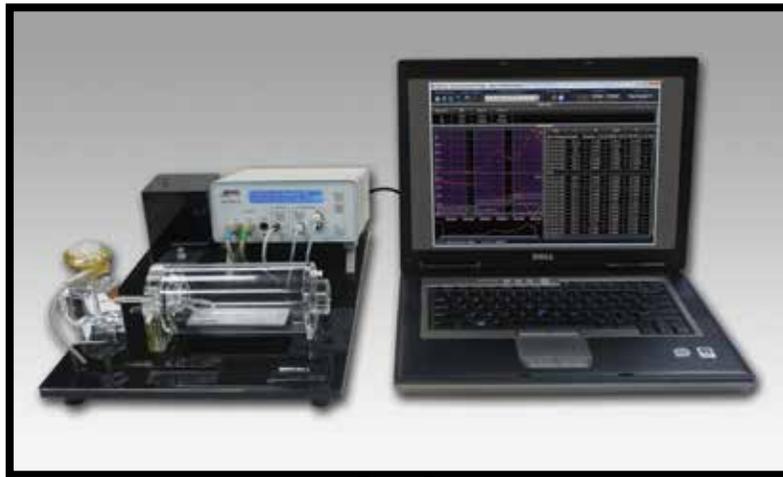
Software

Easy Setup

Well-placed, preconfigured hardware and color-coded cables make setup fast and easy. Easy setup and take down make these systems extremely portable.

Automated Calibration

Automated calibration eliminates user errors from one of the most error-prone tasks in data collection. Since FinePointe also runs system checks on the apparatus during calibration, you can be certain that your data will be consistent and reliable.

Network Enabled

FinePointe software can operate in a server/client capacity, or as a standalone application. Data is centrally managed, meaning you can access it from anywhere on the network.
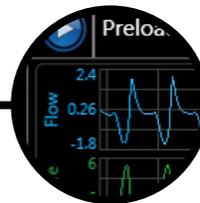
FinePointe Station

Complete data acquisition software

- Guides you through your data collection
- Features fully annotated data display
- Large selection of predefined views
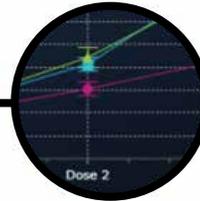
FinePointe Review

Powerful reporting engine

Instant reports include:

- Dose Response
- PC200
- Time Course
- Antagonist
- Toxicity, and more

FinePointe Control Panel

Manages administrative tasks such as hardware configuration, security, software updates, user management, and policy management.

Buxco FinePointe for Resistance and Compliance (RC)

Features

- **Continuously measure lung resistance and dynamic compliance in anesthetized animals**

- **Automated calibration**

- **Heated bed**

- **In-line aerosol delivery and control**

- **Built-in FinePointe console enables control from the site**

- **Use with intubated animals for longitudinal studies**

- **Intelligent ventilator supports protocol-driven deep inflations, breath holds, and PEEP**

- **Single USB connection to computer**

- **Live display and monitoring of the signals and derived data**

- **Multiple and simultaneous subjects capable (no limits)**

- **Optional static compliance measurement available**

- **Optional heart rate or blood pressure monitoring**

DSI's Buxco FinePointe Series RC sites provide hardware necessary to collect invasive resistance, dynamic compliance, static compliance, and elastance data in anesthetized animals.

The subject is anesthetized and instrumented to directly measure the animal's respiratory flow and lung pressure. From these direct measurements of the airflow and lung pressure, R_l and C_{dyn} are computed. This system can be used with either tracheostomized or intubated animals. With intubation, you can perform longitudinal studies.

The Buxco FinePointe RC system for mouse. Its compact design takes up only 30 x 45 cm of table space.

The Buxco RC Chamber for Rat/GP

The RC analyzer reading flow, pressure, and volume signals. Scrolling signal data is recorded while simultaneously, trend graphs and tabular data are derived. All data is annotated.

Available for:

Mice, Rats, Guinea Pigs

A typical single site system for mice, rats or guinea pigs includes a Buxco FinePointe RC Controller and Table.

Also available for other species including dogs, monkeys, horses, and swine, using the QT digital preamplifier unit, with a flow transducer, pressure transducer, and a pneumotach to measure flow.

FinePointe for Non-Invasive Airway Mechanics (NAM)

Features

- **Continuously measures specific airway resistance in conscious animals**

- **Automated calibration**

- **Aerosol delivery and control**

- **Allay™ chamber design significantly reduces subject loading and acclimation time**

- **Chambers incorporate the patented Halcyon® noise-suppression design**

- **Scalable for high throughput - easily attach 12 sites to a single computer**

- **Each USB connection to computer supports 2 or 4 chambers**

- **Uses Allay™ Restraint for maximum subject comfort**

Available for:

Mice, Rats, Guinea Pigs

A typical single site system for mice, rats or guinea pigs includes a Buxco FinePointe NAM Controller and Table.

DSI's FinePointe Series NAM sites are used to acquire specific airway resistance (sR_{aw}) in conscious subjects. Scientifically established and accepted for over 30 years, this technique measures sR_{aw} by monitoring the phase delay between the nasal and thoracic flows[1]. This system is ideal for researchers interested in airway resistance without anesthesia.

The subject is restrained in a special chamber which allows the independent measurement of nasal and thoracic flows. The airway resistance is related to the phase difference between these two flows. This is a direct measurement of airway resistance.

[1] BE Pennock, CP Cox, RM Rogers, WA Cain, and JH Wells. A noninvasive technique for measurement of changes in specific airway resistance. Journal of Applied Physiology: Respirat. Environ. Exercise Physiol. 46 (2): 399-406, 1979.

The 2-site NAM station. The base is 15 cm high, the table top is approximately 45 x 40 cm. It accommodates 2 chambers—either mouse, rat, or guinea pig. Shown here are 2 mouse chambers.

Also available in the larger, 4-site version.

Buxco FinePointe Station software presenting data from a Buxco FinePointe NAM Site: reading thoracic, nasal, and volume signals. The bottom left of the screen displays the trend graphs for Tidal Volume and Specific Airway Resistance. The table displays the current numerical data derived from the signals presented above. Report measurement periods are highlighted in purple.

The mouse NAM plethysmograph
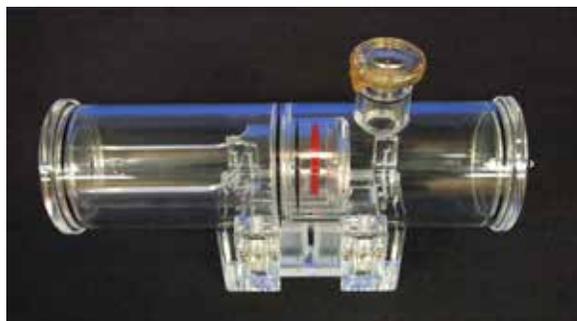
The rat plethysmograph fits onto the same footprint as the mouse plethysmograph, as does the guinea pig plethysmograph, making it possible to use only one table with several different sizes of plethysmographs.

FinePointe Series Whole Body Plethysmography (WBP)

Features

- **Subjects are conscious and unrestrained**

- **Continuously measure respiratory rate, TV and MV**

- **Continuously measure for index of bronchoconstriction (PenH and Pause)**

- **Continuously measure airway irritation (TB and TP)**

- **Use for cough analysis**

- **Automated calibration**

- **Aerosol delivery and control**

- **Chambers incorporate the patented Halcyon® noise-suppression design**

- **High throughput - easily attach and measure data from more than 12 sites simultaneously, with a single computer**

- **Each USB connection to computer supports 2 or 4 plethysmographs**

- **Pre-calibrated digital and Temperature and Humidity sensors**

- **Detachable control console allows for flexibility in equipment setup**

- **Part of the GLP Core Studies for Safety Pharmacology**

Applications Include

Bronchoconstriction, Tidal Volume, Respiratory Rate, Airway Irritation, Dose Response, Airway Hyperresponsiveness

DSI's Buxco FinePointe Series WBP sites monitor the respiration of conscious, unrestrained animals. The animal is placed in a chamber and allowed to breathe naturally, unrestrained and untethered. The system measures the tiny air flow which is exchanged in and out of the entire chamber due to the animal's respiration (called box flow). By applying Boyle's Law, the box flow can be correlated to the animal's respiratory flow.

Using special algorithms, FinePointe software analyzes the box flow for many respiratory applications including tidal parameters, indications of bronchoconstriction, indications of airway irritation, metabolism and cough analysis. Since data is collected without the stress of restraint, surgery or effects of anesthesia, this technique may be the best choice for longitudinal studies, studies requiring long-term measurement, or high throughput.

The photo above shows a 4-site FPWBP for mouse (controller and console behind the chambers). Also available in a smaller 2-site version.

A typical system includes a FPWBP unit (includes bias flow and preamplification, for guinea pig, mouse and rat chambers) and four chambers, equipped with nebulizer heads for aerosolization.

Available for:

Mice, Rats, Guinea Pigs, Rabbits and other medium- and large-sized species. Additional species or custom chambers may be available upon request.

Subjects larger than a guinea pig require using the QT digital preamplifier unit with a flow transducer and an appropriately sized WBP chamber to measure flow.

A typical 2- or 4-site system for mice, rats, or guinea pigs includes a FinePointe WBP Table.

The Whole Body Plethysmograph measures box flow, which is indirectly caused by respiratory flow of the animal inside the chamber. Respiratory volume and flow parameters estimated from box flow are typically accurate to within 30%. Real-time temperature and humidity monitoring further improves the accuracy of these parameters.

Whole body plethysmography can also be used to measure Time of Pause and Time of Break—indicators of airway irritation[1]. These parameters indicate where in the airway irritation occurs.

Outfitted with aerosol delivery, the whole body plethysmograph can be used as a high throughput screening tool for bronchoconstriction. While some journals will not accept research based solely on this technique, the indicators (PenH and Pause) have been shown repeatedly to correlate well with direct methods of airway resistance. Invasive resistance measurements (Buxco FinePointe RC) and non-invasive airway mechanics (Buxco FinePointe NAM) can be used to support data collected with whole body plethysmography.

An example of a report in the FinePointe software including ANOVA statistics.

During acquisition, scrolling signal data gets recorded while simultaneously, trend graphs and tabular data are derived. All data is annotated. In FinePointe Review, you can scroll through the entire experiment.
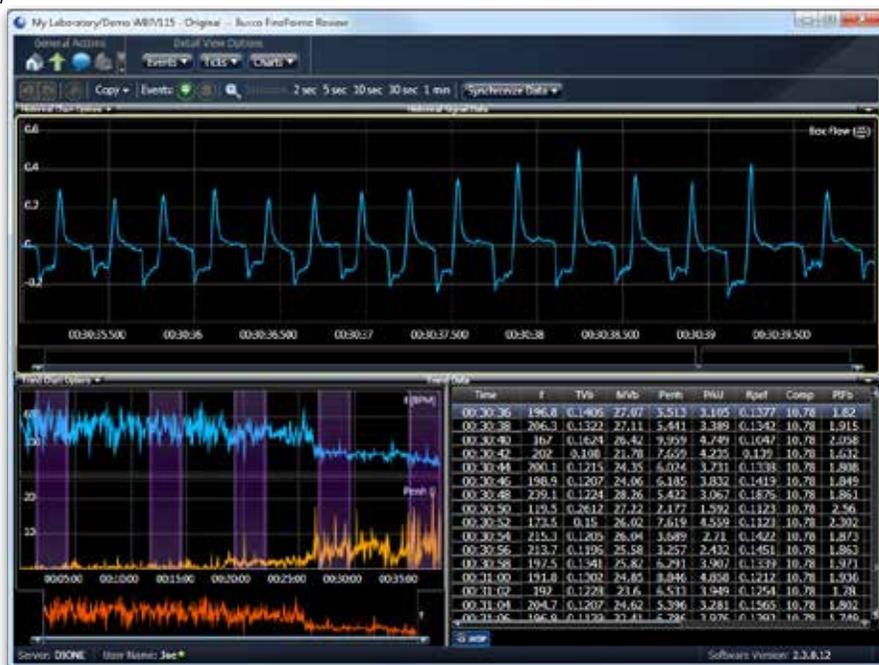
[1] *R Vijayaraghavan, M Schaper, R Thompson, MF Stock, MA Boylstein, JE Luo, Y Alarie. Computer assisted recognition and quantitation of the effects of airborne chemicals acting at different areas of the respiratory tract in mice. Arch. Toxicol., (1994) 68: 490-499.*

Pulmonary Function Testing (PFT)

Features

- **Most comprehensive assessment of the lung**

- **Complete a series of tests in just minutes**

- **View results immediately, use overlays to compare repeated tests**

- **Ideal for chronic obstructive pulmonary disease (COPD) studies**

- **Determine FRC and other lung capacities**

- **Software reports forced expiratory volume (FEV), forced expiratory flow (FEF), and many other values**

- **Direct measurement of pulmonary mechanics - lung resistance and dynamic compliance**

- **Reports produce group average of P-V loops and F-V loops**

Available for:

Mice, Rats, Guinea Pigs, and NHP. Additional species or custom chambers may be available upon request.

Available Tests:

- Boyle's Law FRC
- Fast Flow Volume
- Quasistatic Pressure Volume

Resistance and Compliance analysis is also available.

Similar to spirometry in cooperative humans, the pulmonary function testing system provides comprehensive PFT data for preclinical applications.

For the functional residual capacity (FRC) test, subjects must be spontaneously-breathing. For other tests, subjects may be ventilated (ventilator included) or spontaneously-breathing. Subjects are anesthetized, and the tests are automated.
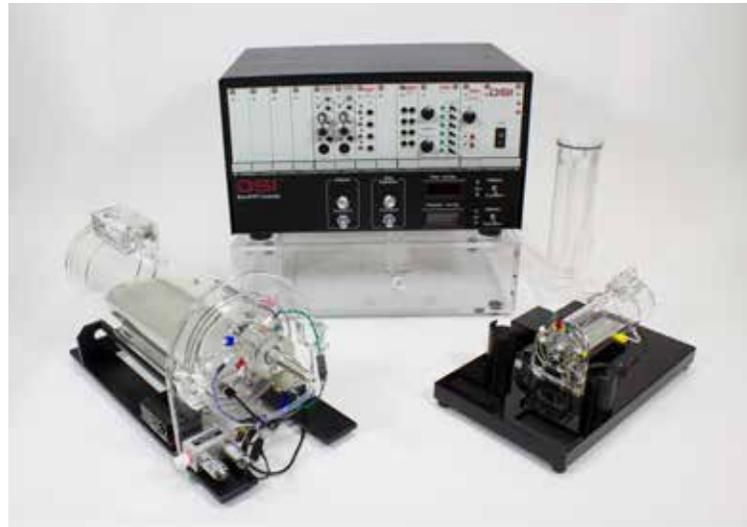
PFT controller, calibrator and chambers. The PFT system includes a control panel with pressure/vacuum reservoirs, and plethysmograph.

An FV Loop report showing the results of two different groups on the same graph.

A PV report showing the results of two different groups, on the same graph.

An example of a fast flow volume chart and a pressure-volume loop during normal ventilation.

ECG Analysis

Features

- **Simple Calibration Wizard**

- **Live Monitoring of all ECG signals and Blood Pressure**

- **Built-in Reporting**

- **Simple Algorithm Configuration**

- **Applications Include:**

  -**Dose Response experiments**

  -**Antagonist experiments**

  -**Toxicity experiments**

Parameters Measured Include:

HR, Rh, QRS, PR, QR, Ph, Pwidth, QT, QTc, ST, Sth

DSI's FinePointe software for ECG provides data collection for up to 3 ECG leads (simultaneously) and one arterial blood pressure signal. ECG interval analysis is provided for one lead. ECG analysis measures intervals such as QT, PR, ST, QRS, Pwidth, and includes corrected QT using one of 4 correction techniques. Identification of these waves is performed using the ECG pattern recognition algorithm.

The Arterial Blood Pressure analyzer derives Ejection Time and Time-Tension index, in addition to typical BP parameters.

The ECG pattern manager, shown above, lets you identify example P and T waves. Click and drag to define the wave limits.

Smoke Generator

Features

- **Over 8-24 hours of unattended operation**

- **Wide range of cigarette sizes accepted**

- **Automated delivery, lighting, positioning and ejection of cigarettes**

- **Direct smoke puffed by mechanical lung, allows control of puff volumes and rates, including industry standard puff settings**

- **Direct smoke and indirect smoke are available through separate ports**

- **Smoking chamber is lit internally**

- **Cleanable glass door and chamber ceiling to allow a clear view of the smoking cigarette**

- **Sealed chamber prevents virtually any smoke from escaping to lab**

- **Compact size to fit small lab spaces and standard hoods**

DSI's Buxco Smoke Generator is completely automated and requires no on-site operator. Simply load the cigarettes, press "Start," and the system will run unattended. It captures direct and indirect smoke, and delivers it to mass dosing chambers or individual exposure tubes.

The basic system comes configured to smoke 80 cigarettes before emptying the tray. With the expansion option, it can burn 300 cigarettes before emptying the tray.

The smoke generator with a Buxco Inhalation Tower. When the exposure chambers are attached, this system will provide smoke to up to 14 subjects.

Inhalation Tower

DSI's Buxco Inhalation Tower is a compact, "flow past" design, with fourteen (14) exposure ports for mice and rats.

The Inhalation Tower features:

- "Flow past" concentric design, so each animal receives the same exposure
- Top and bottom ports, for delivering aerosols, gases and dusts
- Low dead-space nose adapters
- Easy disassembly for cleaning
- Flexible base design options
- Aluminum construction for ease of handling. Stainless steel version also available.
- Support pins for securing heavier animals
- This tower can be used in slight positive or slight negative pressure configurations

Inhalation Tower (stainless steel)

Inhalation Systems can be outfitted with a variety of delivery and instrumentation options for challenge and environmental monitoring.

We recommend using our exposure restrainers or plethysmographs with patented Allay™ restraints. Allay restraints secure the animal without compressing its thoracic cavity or otherwise affecting the animal's respiration, making the animal's breathing more natural and reducing acclimation time.

For delivery to only one subject at a time, use the single subject exposure equipment.

Single Subject Exposure

DSI's Buxco Single Site Exposure Station is a single port nose-only exposure device.

A cost-saving version of the Inhalation Tower, which allows uniform exposure, one subject at a time.

- Use with nose-only restrainers and plethysmographs
- Available for mice and rats
- Low dead space exposure area
- Aerosol delivered by Aerogen Aeroneb® nebulizer

Mass Dosing Chambers

DSI's Buxco Mass Dosing Chambers are used to expose multiple subjects to an aerosol or gas when general dosing can be tolerated. For precise nose-only exposures, use the Inhalation Tower system.

Use with the Mass Dosing Aerosol Controller to control the nebulizer, or generate your own. A separate bias flow supply may be needed.

Features

- **A perforated floor for urine drainage**

- **A removable lid (no seal, should be used inside a containment hood)**

- **Two ports for aerosol or gas delivery**

- **Four Luer ports for bias flow or other use**

Use the Mass Dosing Chamber and Controller, pictured above, to administer aerosol or gas to many subjects at once.

The Mass Dosing Chamber can hold approximately 15 mice, 6 rats or 2 guinea pigs

The Large Mass Dosing Chamber can hold approximately 25 mice, 10 rats or 4 guinea pigs

QT Digital Preamplifier - General Purpose Data Acquisition

The QT digital preamplifier is a high performance modular interface for legacy and custom systems. This unit provides the I/O which is most commonly required by lab applications. Unlike the Buxco FinePointe series of products, which provide special-purpose dedicated devices, this unit provides general-purpose devices.

The QT accepts up to eight strain gage transducers and up to four digital temperature and humidity sensors. It can drive up to four Aerogen Aeroneb® nebulizer heads, and provides four bits of digital output. The preamplifier needs no zero adjustment, transducer balance, or gain adjustment.

The temperature and humidity sensors do not require calibration. The QT is typically used for large animals or custom applications. The QT is also used with the Inhalation Tower, seen on page 16.

The QT Digital Preamplifier with Aerosol Control supports 4 Aerogen nebulizers, 4 digital temperature/humidity sensors and 8 flow transducers.

Features

- **Exceptionally quiet electronics**
- **24 bit A/D conversion**
- **RJ45 connectors for ultra-quiet transducer inputs**
- **USB output**
- **Supports up to 4 temperature and humidity sensors**
- **Supports up to 4 Aerogen nebulizers**
- **Provides 4 bits of digital output control**

Bias Flow Fresh Air Pumps

Bias Flow is a used with plethysmographs to keep fresh air available in the chamber for the subject to breathe. Utilizing a unique internal design, the unit ensures the flow is extremely quiet and minimizes noise introduced on the measured plethysmograph flow.

For use with legacy systems. Not required for Buxco FinePointe series products.

Fresh air prevents carbon dioxide accumulation and helps stabilize temperature and humidity.

Flows are regulated and require no adjustment. Push buttons turn individual channels on and off.

4-site Bias Flow

Also available is the 4-site Bias Flow with a 20 LPM capacity.

## Features

- **Push or pull selectable on the console**
- **Select between 2 configurable flow levels**
- **Provides independent flow control for up to 4 chambers**
- **Automated calibration**

About DSI's Buxco Plethysmographs

Buxco plethysmographs are the most advanced and humane plethysmographs ever developed. All chambers are carefully designed for each species, and built with unequalled workmanship to provide the highest possible performance. The patented Halcyon® pneumotachs reduce atmospheric noise, making the measured flow signal as much as 20 times quieter. Patented Allay restraints make restraining the animal easy.

Halcyon® Pneumotach

The Halcyon® pneumotach is used in most of the Buxco plethysmographs. It cancels out noise by ensuring that both sensing ports on the differential pressure transducer measure the same pressure from an atmospheric event. As a result, artifacts due to slamming door, air ventilation ducts, or other air disturbances are minimized. This pneumotach is especially important for sensitive flow measurements required by whole body plethysmography or FRC measurements.
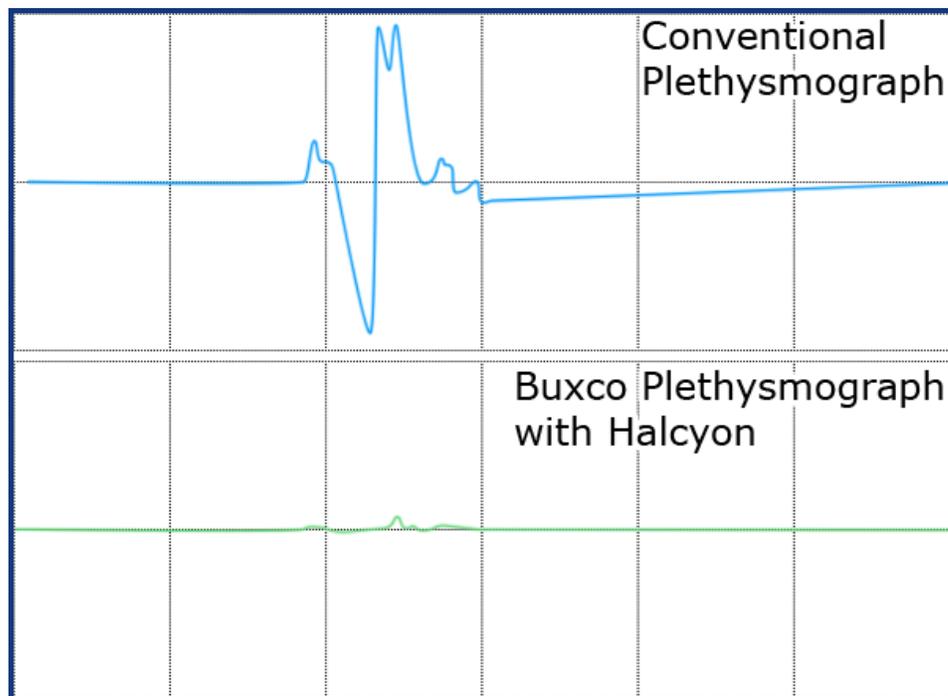
*This graph illustrates a comparison of the Halcyon®
pneumotach with a traditional pneumotach.*

- Noise artifacts are more than 20 times smaller
- Screens remain cleaner longer
- Tuned for optimal frequency response characteristics

*The Halcyon®
pneumotach
for large animal
plethysmograph*

About DSI's Buxco Plethysmographs

The Allay™ Restraint

The patented Allay™ restraint secures the animal without compressing the thorax and keeps airways completely unobstructed. This restraint improves animal comfort and respiratory data collection since the animal can breathe more naturally. Traditional restraints rely on a plunger to restrain the animal which compresses the animal. Breathing patterns observed using a plunger are unnatural, and frequently exhibit inspiratory holds as the animal struggles to breathe. The Allay™ restraint facilitates a completely natural and relaxed respiratory pattern.

In addition, many chambers require a seal (usually a neck seal), and those chambers combine the restraint, seal and plethysmograph pneumotach into a single unit. This design makes it very difficult to insert the animal and to ensure a leak-free seal. With the Allay™, you first restrain the animal, then you apply the seal, and finally, you insert the restrained and sealed animal into the plethysmograph. By separating those tasks, the Allay™ restraint system makes it easy to safely restrain and seal the animal.

Features

- **Easy to restrain the animal**

- **Animal can breathe naturally, unobstructed by any tight mesh or plunger**

- **Animal requires less training (typically less than half the training required by traditional restraints)**

- **Restraint provides full access to animal**

The Allay™ restraint comes in several sizes to provide the best fit for your subject.

Unrestrained Whole Body Plethysmographs

Quiet Baselines

DSI's Buxco unrestrained whole body plethysmographs incorporate the patented Halcyon® pneumotachograph technology for the quietest baseline signals. Quiet baselines simplify calibration and reduce the need for filtering and breath rejection.

Integrated Temperature and Humidity Measurement

For researchers focusing on ventilatory parameters, real time temperature and humidity monitoring improves results. Buxco chambers accept an integrated temperature and humidity probe which shares a cable with the flow transducer, providing a more organized workspace.

Aerosol Delivery Options

The chambers' top ports accept Aerogen's Aeroneb® nebulizer unit for direct introduction. The ports also accept aerosol from a shared distribution system or other technologies with a 22 mm connection.

The WBPs come in many sizes. Shown here are the Mouse WBP (left) and the Rat WBP (right).

Part Number	Description
601-1425-001	WBP Chamber w/Halcyon Technology - Mouse
601-1427-001	WBP Chamber w/Halcyon Technology - Rat
601-1429-001	WBP Chamber w/Halcyon Technology - Guinea Pig
601-1431-001	WBP Chamber w/Halcyon Technology - Rabbit
601-1428-001	WBP Chamber w/Tower with Halcyon Technology - Rat
601-1430-001	WBP Chamber w/Tower with Halcyon Technology - Guinea Pig
601-1426-001	WBP Chamber with Warming Bed and Halcyon Technology - Mouse Pup

Unrestrained Whole Body Plethysmographs

Mouse Pup Plethysmograph

This chamber is specifically for respiratory studies of neo-natal mouse pups. It is smaller and more sensitive than regular mouse chambers and comes with a built-in heated bed. The chamber features Halcyon® pneumotachs for the best possible noise cancelation demanded by this sensitive measurement.

Features

- **Halcyon® pneumotach**
- **Built-in regulated heater**
- **Aerosol port**
- **Bias flow ports**

Head-Out Plethysmographs
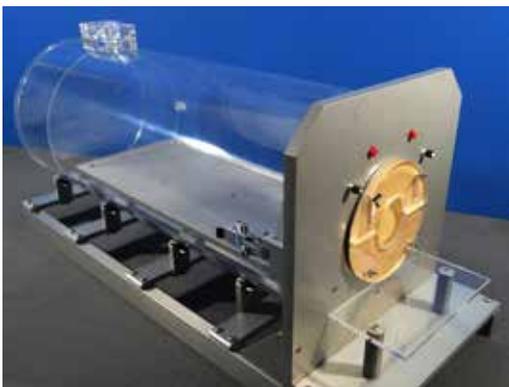
All of the head-out chambers feature the Allay™ restraint (see page 19).

For the study of conscious subjects, individually or several simultaneously. These chambers provide direct measurement of flows with no temperature or humidity dependence, and no bias flow requirement.

The head-out chamber for NHP

Part Number	Description
601-2030-001	Head-Out Chamber w/Allay Restraint and Halcyon Technology - Mouse
601-2031-001	Head-Out Chamber w/Allay Restraint and Halcyon Technology - Rat
601-1825-001	Head-Out Chamber - Guinea Pig
601-1826-001	Head-Out Chamber w/Halcyon Technology - Rabbit
601-1828-001	Head-Out Chamber w/Halcyon Technology - NHP (Cylindrical on Rails - 14" Dia.)

Contact your DSI sales representative for appropriate animal size capabilities.

Non-Invasive Airway Mechanics Plethysmographs

For non-invasive, conscious animal measurements of mechanics and ventilatory parameters, such as Non-Invasive Airway Mechanics.

The Mouse Double Chamber

Part Number	Description
601-1225-001	FinePointe NAM Chamber w/Allay Restraint and Halcyon Technology - Mouse
601-1226-001	FinePointe NAM Chamber w/Allay Restraint and Halcyon Technology - Rat
601-1228-001	FinePointe NAM Chamber w/Halcyon Technology - Guinea Pig

Contact your DSI sales representative for appropriate animal size capabilities.

Nose-Only Plethysmographs

For nose-only inhalation exposure using an inhalation tower system and simultaneous monitoring of ventilatory parameters, as compared to the Nose-Only Exposure Restrainers below.

The nose-only restraint for large rat, shown here with transducer attached.

Part Number	Description
601-2025-001	Nose-Only Plethysmograph w/Halcyon Technology and Allay Neck Restraint - Mouse
601-2041-001	Nose-Only Plethysmograph w/Halcyon Technology and Allay Neck Restraint - Rat
601-0005-001	Nose-Only Plethysmograph w/Halcyon Technology and Allay Neck Restraint - Std/Med Rat
601-0005-002	Nose-Only Plethysmograph w/Halcyon Technology and Allay Neck Restraint - Medium Rat
601-2042-001	Nose-Only Plethysmograph w/Halcyon Technology and Allay Neck Restraint - Large Rat

Contact your DSI sales representative for appropriate animal size capabilities.

Plethysmographs for Invasive Measurements

These plethysmographs are used for invasive measurements such as pulmonary function testing, and resistance/compliance studies.

They come prepared with valves and solenoids that allow tracheal connections to room air, negative pressure, positive pressure, or completely blocked. A heated table keeps the subject at the most comfortable body temperature.
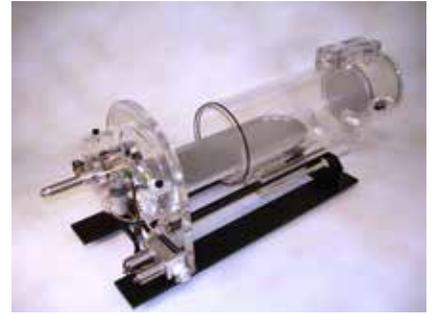
The Rat/GP chamber for PFT

Part Number	Description
601-1629-001	PFT Chamber - Mouse
601-1628-001	PFT Chamber - Rat/GP
601-1831-001	FinePointe RC Chamber w/Heated Bed - Mouse
601-1831-002	FinePointe RC Chamber w/Heated Bed and ECG leads - Mouse
601-1027-001	FinePointe RC Chamber w/Heated Bed - Rat/GP
601-1027-002	FinePointe RC Chamber w/Heated Bed and ECG leads - Rat/GP

Nose-Only Exposure Restrainers

For nose-only inhalation exposure using a tower system.

The nose-only exposure tube for mouse. Used with the Inhalation Tower, seen on page 16.

Part Number	Description
601-2026-001	Nose-Only Restraint w/Allay Neck Restraint - Mouse
601-2032-001	Nose-Only Restraint w/Allay Neck Restraint - Rat
601-0005-005	Nose-Only Restraint w/Allay Neck Restraint - Std/Med Rat
601-0005-006	Nose-Only Restraint w/Allay Neck Restraint - Medium Rat
601-2040-001	Nose-Only Restraint w/Allay Neck Restraint - Large Rat

DSI's FinePointe software is a powerful, easy-to-use tool for collecting, analyzing, and reporting life science data. Built with the latest Microsoft technologies, FinePointe software runs on modern Windows operating systems, stores its data using Microsoft SQL Server®, and can operate on a single computer or, if enabled, across a network.

Streamlining the Process of Obtaining Reports

FinePointe software begins and ends with the report. One of the very first steps in creating a study is deciding on a report template and selecting the initial parameters to display.

Once the report is defined, the system guides you through the steps necessary to collect and view your data.

FinePointe software makes ample use of wizards to guide you through important features of the product. Wizards help with calibration, study creation and setup, the management of subjects and groups, and the definition of reports. Settings can be changed at any time.

Just start up, collect data, and view the report.

With a single click, you can export your report to applications including Microsoft Excel®, GraphPad Prism®, and SPSS®.

The "Create Report" wizard, above, guides you through a simple 3-step process.

Your updated report appears as soon as each recording session is over.

Reported parameters, subject grouping, report calculations, and measurement periods all can be adjusted at any time.

25

Reporting

While all your data can be exported to Excel, text, Open Office®, and a variety of other statistical packages for report processing, FinePointe software comes with a complete built-in reporting capability. Within a single study, you can setup as many reports as you need. As you acquire the data for your study, the reports are updated to include the new data within seconds.

Reporting measurement intervals are automatically defined and can be easily adjusted

FinePointe Station, the data acquisition component of FinePointe software, will walk you through the steps necessary to collect data for your reports. As you collect data, FinePointe Station saves measurement intervals which are summarized to produce your reports. These measurement intervals are saved with the data and can be reviewed or adjusted at any time.   In addition, you can easily identify regions of data that you want excluded from the reports. These excluded regions are also saved with your data. Anytime you add or modify the excluded regions or measurement intervals, your reports are instantly updated, creating a completely traceable report.

Data From Subjects
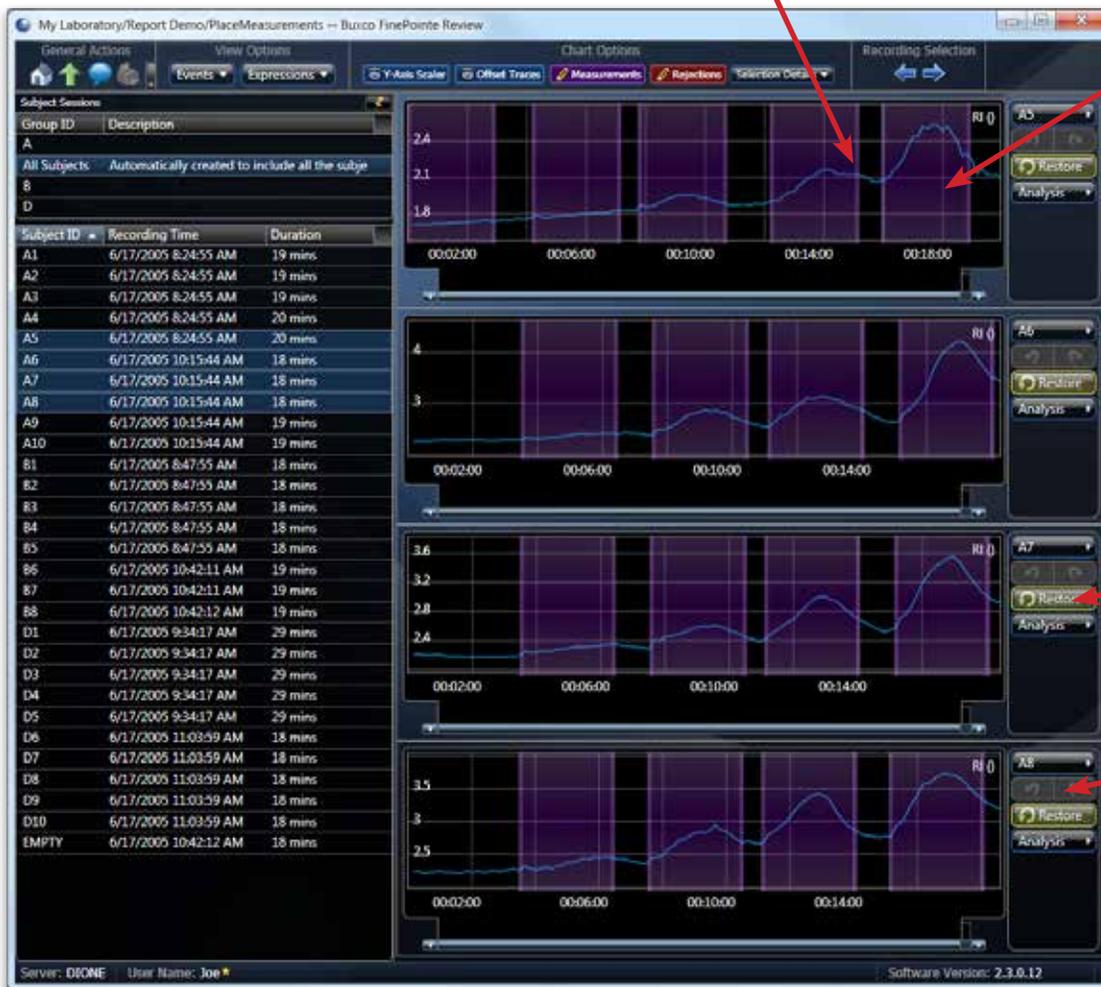
Adjustable Measurement Intervals

Restore Buttons set the intervals back to their original values

Undo Buttons

Reporting, continued...

Reports summarize subject groups

An important part of reporting is combining data from individual subjects into groups. FinePointe software imposes no limits on the number of subject groupings you can have. Subjects can be added and removed from groups at any time. When groups are changed, the reports which reference those groups will be updated instantly.

This screen shot shows the page used to configure your groups.

FinePointe software provides common statistics and can export to statistical software

Typically, a measurement is summarized using a function such as maximum, minimum, average, or area. FinePointe reporting supports all these functions and many more. FinePointe reporting also provides common statistics: including F-test, p-value, t-test, confidence intervals, standard deviation, and standard error. And if the statistics provided are not sufficient, with a single click you can export the report directly into Excel®, GraphPad Prism™ or SPSS™. The report can be exported to text files, which can be read by any other statistical software program.

Single-click Export Buttons

Group Summary

Statistics

Group Detail
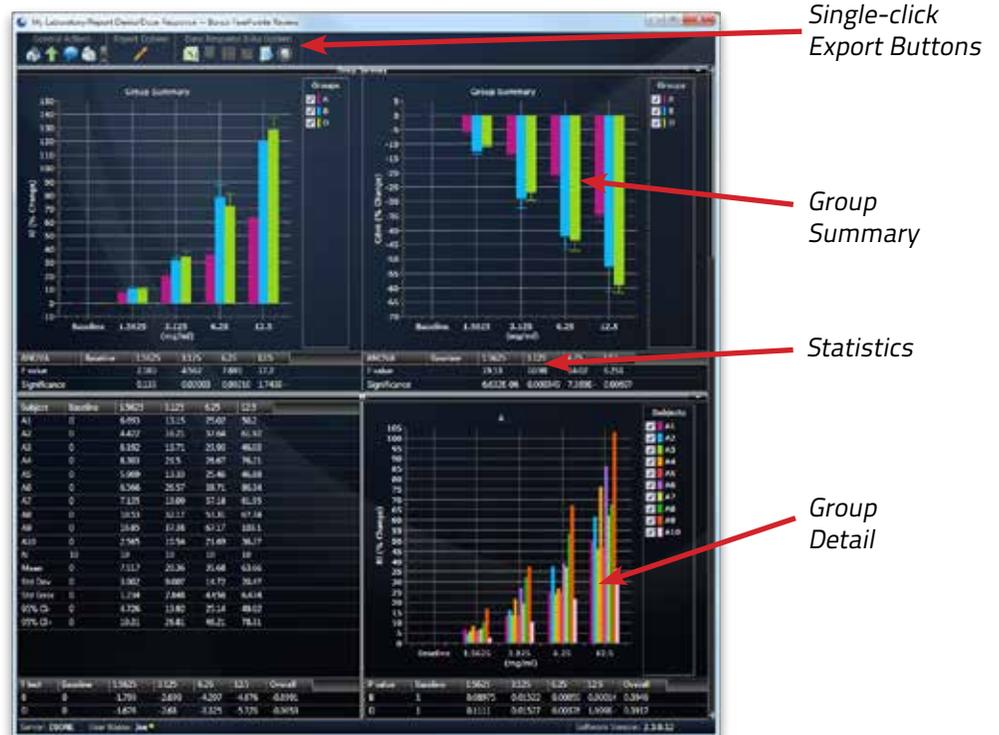
All these reporting features mean one thing: you can concentrate on what you need to in order to get your study data, rather than the labor of producing the report. In addition, you can be sure that all the processing is performed consistently and objectively with computer precision. Human errors are substantially reduced, and data is fully traceable and documented.

Data Acquisition with FinePointe Station

Go On Button

Next Concentration Text Indicator

Large Dashboard Area for Key Parameters

Event Marks

Live Tabular and Trend Data

Live Waveform scrolling

FinePointe Station introduces an unprecedented integration of data reporting and data acquisition. It provides all the typical data acquisition features you've come to expect, including live scrolling signals, live analyzed results, and manual event marking. Features you will find in FinePointe Station not available in any other system include:

It prompts you to load your next challenge dose—and it shows you what concentration to administer. This feature is extremely helpful when you are collecting data from multiple subjects and your experiment lasts an hour or more.

It shows you where measurements are marked for reporting. Not only does it place the intervals, but FinePointe software allows you to adjust them too. If you modify intervals by mistake, FinePointe Station remembers the original intervals it chose, allowing you to return to the original intervals.

It has many predefined view arrangements.

FinePointe Station provides a robust set of display layouts for you to choose from. With a single click, you can select the display arrangement that suits you best. There is a different set of view arrangements which can take advantage of as many or as few monitors as you choose. Custom arrangement is also available.

Data Acquisition with FinePointe Station, continued...

You can control data acquisition from the FinePointe site hardware. A mouse and keyboard are not always convenient to use during data acquisition. FinePointe sites are designed with a built-in console, which FinePointe Station uses to prompt you with the next concentration right on the site itself.
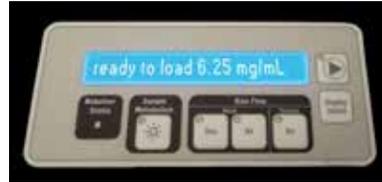
Others on the network with proper security access can view the live data acquisition simultaneously. If you run Windows on your Apple Mac®, you can run the FinePointe client (Review and Station) on a Mac as well. The network interface is fully encrypted and secure.

Computer control right at the site, with FinePointe built-in consoles.
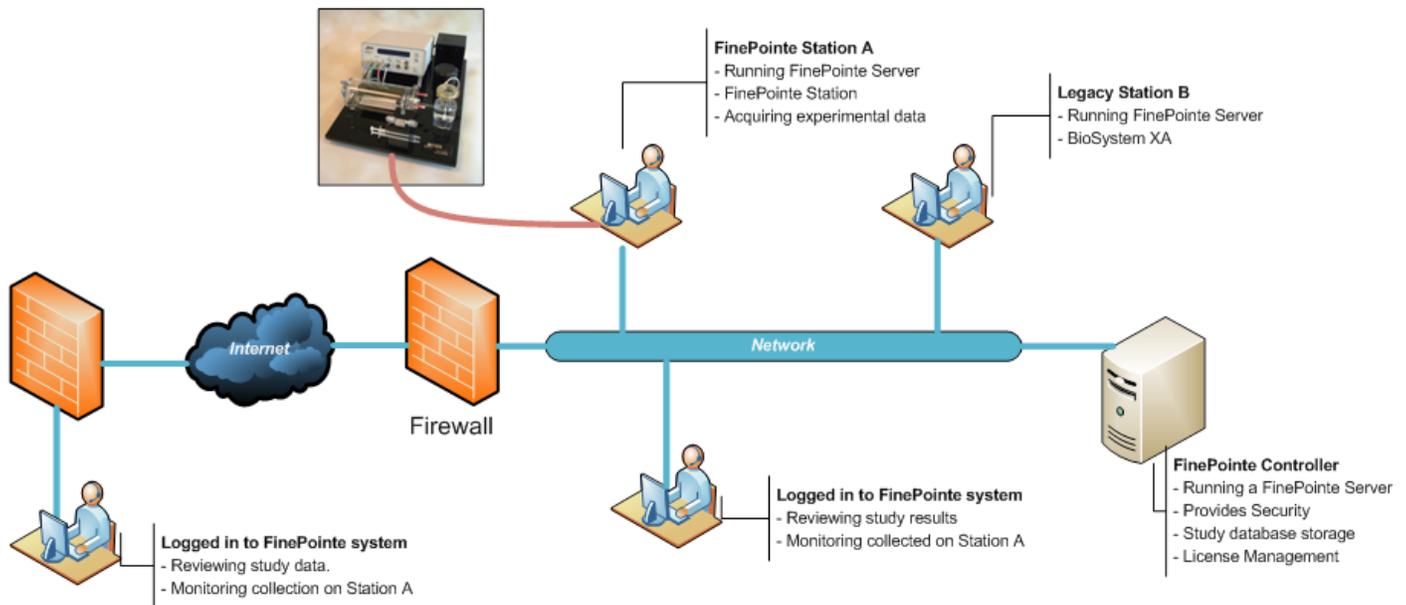
FinePointe software is network-enabled, offering unique features for convenience, collaboration, and data security.

Analytical tick marks are saved. Tick marks are displayed on the waveform so you can see how the analysis is behaving. In FinePointe Station, this is stored with the study data so you can review the tick marks at any time.

Automatic annotations may obviate the need to place manual event marks. As FinePointe Station walks you through the data collection process, it places event marks to annotate when you performed actions necessary to collect data. When stored in Microsoft SQL Server™, it results in your data being completely annotated.

Review data as it is acquired. The detail display for a single site is the same display presented during review. With this display, you can freeze the signal display and scroll through the entire signal from the moment the subject recording began. You can click on a line of analyzed data and have the system place a cursor on the signal data which produced that data. You can also choose to show classes of event marks to fully annotate all the charts and tables.

When your experiment is complete, you can adjust the interval of data which will be stored in the database. If there is data before your experiment officially began that you want to save, simply increase the recording interval on the display to include all the data you want saved.

See Flow-Volume, Pressure-Volume, or Flow-Flow loops. Simply select a few seconds of data on the signal chart, and select which loop to see. FinePointe presents the loop on the display, and as you move or adjust that interval, the loop refreshes instantly.

Data Review with FinePointe Review

Once data is acquired, it is transferred into the study database in Microsoft SQL Server™. The data is stored completely, including signals, analyzed results, measurement intervals, event marks, and tick information. FinePointe allows you to open that recording and browse through it using a display that looks identical to the display you see during acquisition.

Freely browse your data

From this display, you can zoom in, zoom out, and scroll through all your signal and trend data. In addition, you can find signal data associated with analyzed data (and find analyzed data associated with signal data). You can copy data out using the clipboard in text form or image form.

Reanalyze your data

Within review, should your data analysis require modification, you can perform reanalysis on all your data stored in the study database. This reanalysis is not performed in real-time; it is performed much faster, enabling you to reprocess all your subjects in a few minutes. Once it is complete, your reports will automatically summarize data from the reprocessed result. Because the system does not delete the original result, you can switch back to using the original result if you choose.

Compatibility with Older Buxco Systems

FinePointe software is flexible enough to combine in several different ways with existing Buxco hardware and software.

FinePointe Review supports BioSystem XA data

FinePointe Review - the post-analysis component of FinePointe software - even accepts data collected with BioSystem XA. Multiple BioSystem XA studies can be combined, subjects can be grouped, all of the analysis tools can be applied, and a consolidated report produced.

FinePointe Station supports existing Buxco hardware applications

FinePointe software receives and analyzes signals from general purpose Buxco systems that may be used with whole body plethysmography, resistance and compliance, double chamber, head-out, nose-only systems, and metabolism.
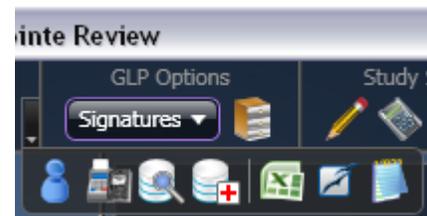
GLP Features

FinePointe software comes with a number of GLP features you can use to collect and maintain data in a manner that abides by the stringent requirements of 21 CFR Parts 11 and 58. GLP features include:

- Enforcement of GLP-required Information
- Audit Trails
- Electronic Signatures
- Specialized Reports Providing Evidence of Data Integrity
- Network Security Features

Control over User Permissions

FinePointe software uses role-based security, for ease of configuration. Roles include titles such as: Study Director, Contributing Specialist, or QA Unit, and each role carries different security clearance. Any given user can have the same role for every study or different roles for every study.

Audit Trails

Every time the study data is changed, the change is logged in the study audit trail. This table is easily accessed from the main software menu. Each entry includes the user name, the time and date stamp, and a description of the modification.

These audit trails are exportable to several different formats, including Excel, text, and OpenOffice.
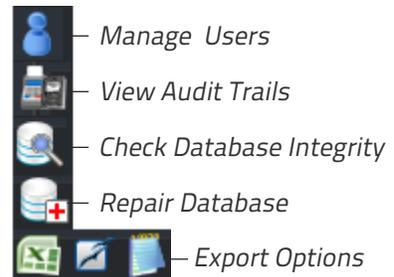
Data Integrity

FinePointe studies are stored in Microsoft SQL Server™ databases, and utilize the tools supplied by Microsoft SQL Server to ensure referential integrity.

Each record also includes a self-checking mechanism to ensure the data has not been altered or manipulated in any unauthorized fashion. This check can be performed by clicking a button in FinePointe.

Electronic Signatures

Depending on what you are signing, and any previous signatures, different signature meanings will be available, such as "Accept," "Reject," or "Approve." Each signature carries its own security implications depending on the signature meaning applied. In addition, each meaning may have different role requirements.   For example, a recording approved by a Study Director may not later be rejected by a Technician. All signatures are logged in a signature history that can be easily reviewed.

This drop down menu gives you instant access to audit trails, data integrity checks and electronic signatures.

- Manage Users
- View Audit Trails
- Check Database Integrity
- Repair Database
- Export Options

This certificate of intent must be filled in for all signatures.

Source Data Reports

Out of an entire study full of data, you will want to examine certain points of interest, or "measurements". A Source Data Report will show you the actual numerical data of any given measurement.

You may view any line of a measurement in a study by using Source Data Reports.

Network and Database Security

FinePointe software may be used over a network, or run on a stand alone machine.

For those using the network features, all network traffic is fully encrypted using a sophisticated 128-bit Rijndael (AES-128) encryption algorithm.

The security information for the FinePointe servers to access the Microsoft SQL Server™ are fully configurable using either SQL server native security, or the Windows Integrated security. In this way, SQL Server can be secured while still providing complete FinePointe functionality.

The Source Data Report records detailed information for each line of data.

About Data Sciences International

DSI is a pioneering biomedical research company focused on preclinical systems physiology and pharmacology. The recognized global leader in physiologic monitoring, DSI offers telemetry, instrumentation, software and services that facilitate accelerated, well-informed drug therapy and development decisions.

DSI serves many industries including: Pharmaceuticals, Academia, Contract Research Organizations, Biological and Chemical defense, the Medical Device Industry, Government, and Biotechnology companies. We offer solutions that are tailored specifically to meet the unique research needs of our customers.

Headquarters and North American Sales:

1-800-262-9687 (U.S.)

1-651-481-7400 (International)

sales@datasci.com

European Sales:

Tel: 31-13-5479356

europe-sales@datasci.com

Asia Pacific Sales:

Tel: 86-21-50793177

dsi-shanghai-office@datasci.com

datasci.com

To learn more about DSI's implantable telemetry devices and all of DSI's other physiologic monitoring solutions, please contact our North American, European or Asia Pacific sales Representatives.

DSI™