Lansmont
Field-to-Lab®

SAVER™ Shock and Vibration Data Loggers and Recorders

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Lansmont SAVER™ Instruments

Presentation Agenda

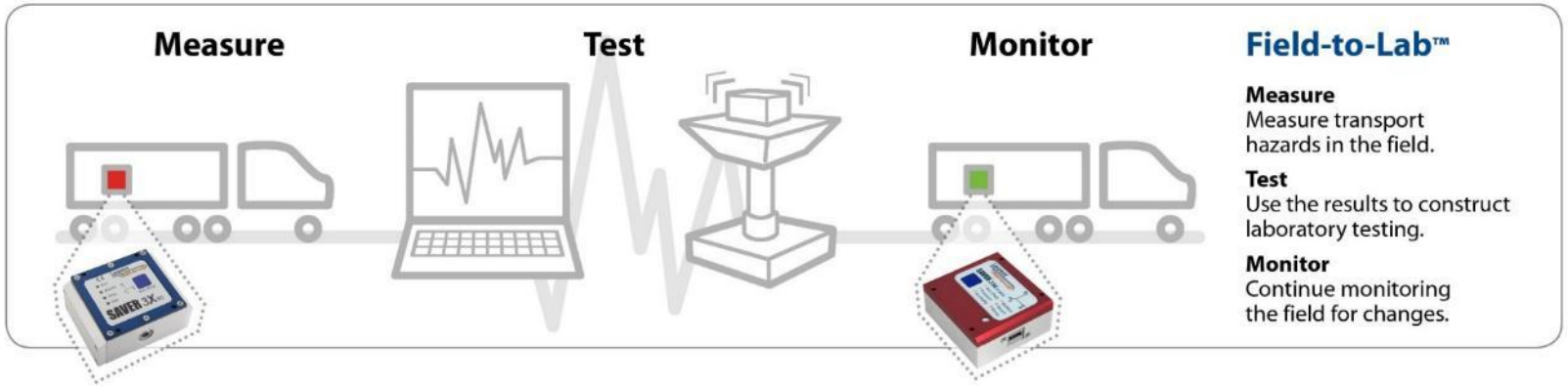
- **Lansmont Introduction**
- **SAVER Instruments**
  - Overview
  - User Benefits
  - SAVER Models
- **Applications**
  - Measurement
  - Monitoring
- **Key Features**
  - Hardware
  - Software
- **The new SAVER AM "Asset Monitor"**
  - SAVER AM versus 3M30+
  - SAVER 3M30 and 3M30+ Support
- **Marketing Materials**
- **Reference**
- **Demo (optional)**

Who We Are:

Lansmont provides state-of-the-art engineering services, manufacturing, and test & measurement solutions for the world's leading technology companies, government institutions, and educational institutions.

- Founded in 1971
- Headquartered in Monterey, California
- Global Sales and Support

Lansmont products measure real-world dynamics and simulate them in laboratory environments. Our products deliver **Field-to-Lab™ solutions.**



ANAB ACCREDITED
ISO/IEC 17025
ANSI/NCSL Z540-1

What We Do...

Lansmont Field-to-Lab®

Design & Manufacture:

- Field Instruments
- Test Instruments
- Shock Test Systems
- Vibration Test Systems
- Drop Test Systems
- Compression Test Systems
- Incline Impact Test Systems
- Mechanical Shakers
- Machine Controls and Instrumentation

Field Instruments


SAVER™ 3D15


SAVER™ 3X90


SAVER™ 9X30


SAVER™ AM

Test Instruments



Test Partner (8 and 32 Channel Configuration)

Test Equipment


Shock


Vibration


Drop


Compression


Impact


Mechanical Shaker

Advanced Engineering & Design Services:

High-performance, application-specific, mission-critical test and measurement systems.

What We Do...

Lansmont Field-to-Lab®

Lansmont actively participates in key industry organizations such as:

- ASTM International
- International Safe Transit Association (ISTA)
- ISO Technical Committee 122 SC3
- International Association of Packaging Research Institutes (IAPRI)
- Institute of Packaging Professionals (IoPP)
- JEDEC – Global Standards for Microelectronics
- SAVE – Shock and Vibration Exchange

ista® distributing confidence, worldwide.™

SAVE SHOCK & VIBRATION EXCHANGE

iapri

JEDEC

Institute of Packaging Professionals

ISO

ASTM INTERNATIONAL Standards Worldwide

At Lansmont, we help our customers:

- Prevent damage
- Build more cost-effective packaging
- Improve quality
- Achieve regulatory compliance
- Increase bottom line
- Meet sustainability goals

Who We Do It For...

Lansmont Field-to-Lab®

Lansmont SAVER™ Instrumentsm

S – Shock

A – and

V – Vibration

E – Environmental

R – Recorder

Lansmont SAVER™ Instruments

Overview

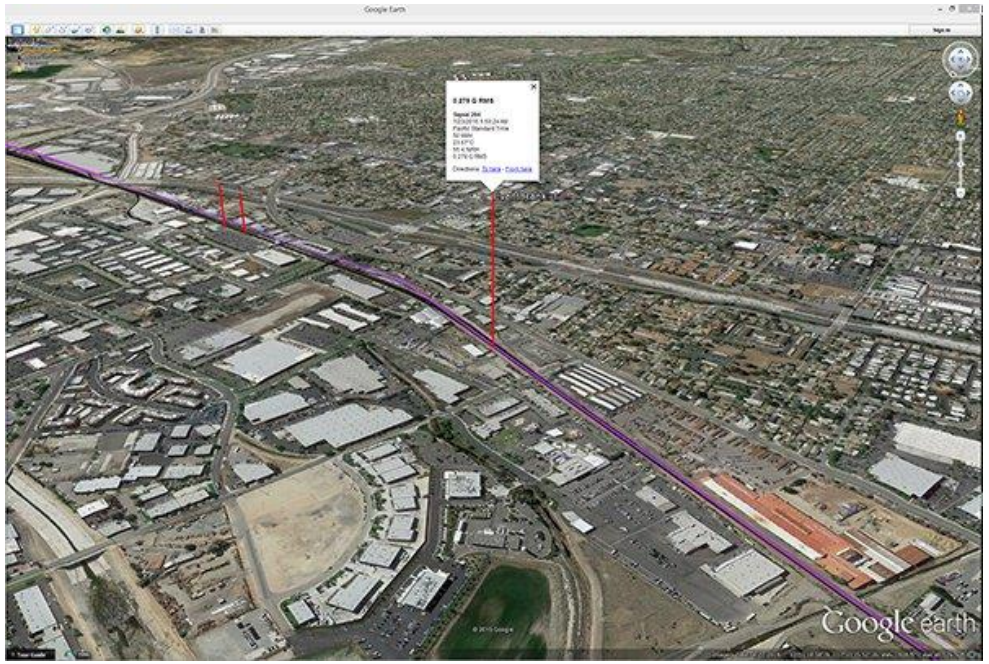
What do these Instruments measure?

- Shock / Impact
- Drop Height (calculated)
- Vibration
- Temperature
- Humidity
- Atmospheric Pressure
- Orientation (SAVER AM)
- Light (SAVER AM)

Lansmont SAVER™ Instruments

User Benefits

- **Data integrity.** High-fidelity instruments ensure accurate data confidence in analysis results.
- **Audit distribution environment.** Evaluate modes, routes, and carriers. Characterize dynamic environments that shipments experience.
- **Solve problems.** Employ Field-to-Lab® methods to determine root cause of damage in the field, define and test solutions in the lab.
- **Optimize packaging.** Remove excess packaging material while improving protection.
- **Monitor critical shipments.** Eliminate uncertainty around potential damage to critical products during transport.



Lansmont SAVER™ Instruments

SAVER™ Models*

Measurement Instruments

SAVER 9X30
SAVER 9XGPS
SAVER 3X90
SAVER 3D15

Monitoring Instruments

SAVER 3M30

Software

SaverXware – One software application for all SAVERs

Accessories and Enhancements

- Embedded GPS
- External channels (accelerometers and cables)
- Mounting Hardware Kits / Magnetic Mounting Brackets

**Made in USA*

Lansmont SAVER™ Instruments

Measurement Instruments (Field-to-Lab®)

"X" and "D" Models

- "Research grade" data recorders with high-density measurement of shock and vibration as well as climatic variables
- Thorough and accurate characterization of the distribution environment
- Used by organizations such as ISTA for data collection on which to base distribution environment profiles
- Versatile instruments for a variety of measurement applications

6 external channels w. option for embedded GPS

DC accels for load stability measurement

Lansmont SAVER™ Instruments

Monitoring Instruments

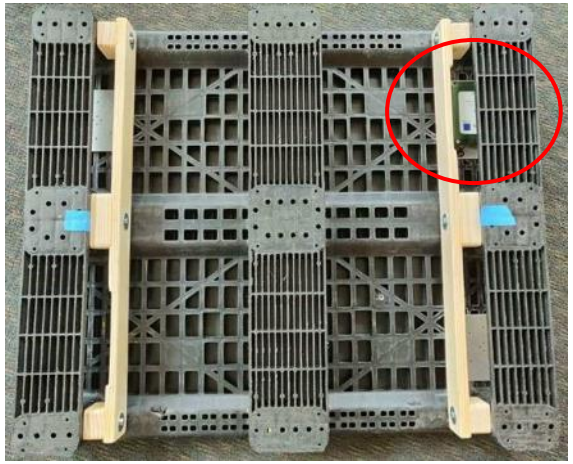
"M" Model

- Capture of dynamic events above user-defined threshold
- Focus on potential damage-producing events
- Timer-based climatic measurements for trending
- Lower cost instrument

SAVER™ Applications

Palletized Loads - Distribution Environment Measurement

- Fixture SAVERs on pallet to measure dynamic input
- Post-process data to characterize the environment

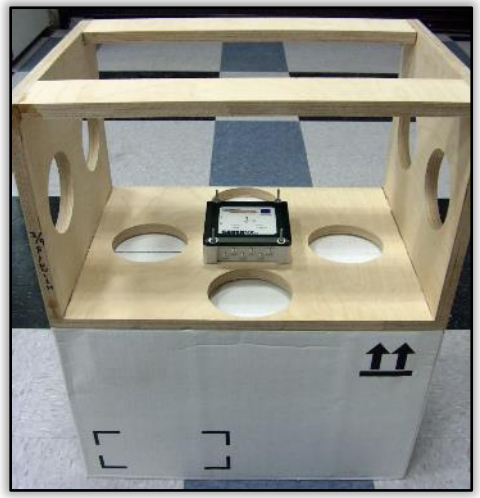


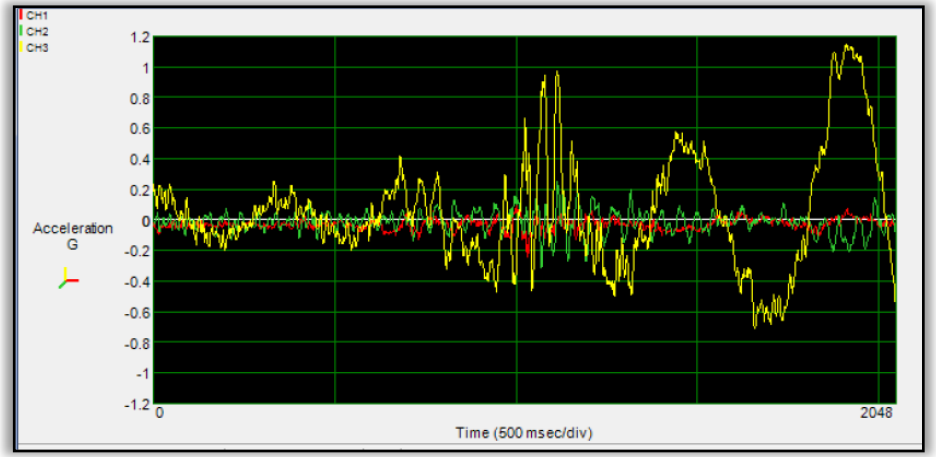
Additional accelerometers on top of stack measure transmissibility

SAVER™ Applications

Packaging – Distribution Environment Measurement

- Fixture SAVER inside a decoy package
- Measure the response to dynamics of the transport environment
- Post-process data to characterize the environment

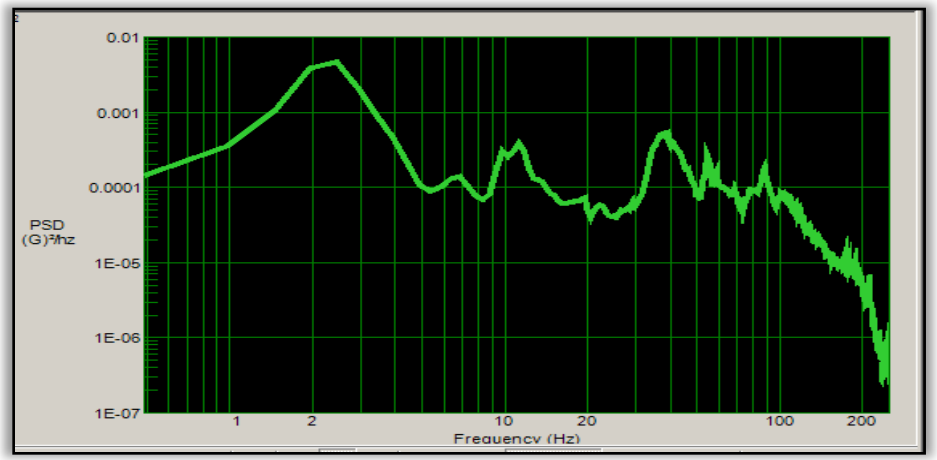




SAVER™ Applications

Vehicles - Distribution Environment Measurement

- Attach SAVER directly to a vehicle to measure the dynamic conditions generated by that vehicle's movements
- Post-process data to characterize the environment



SAVER™ Applications

Aerospace and Defense – High-Value Shipment Monitoring

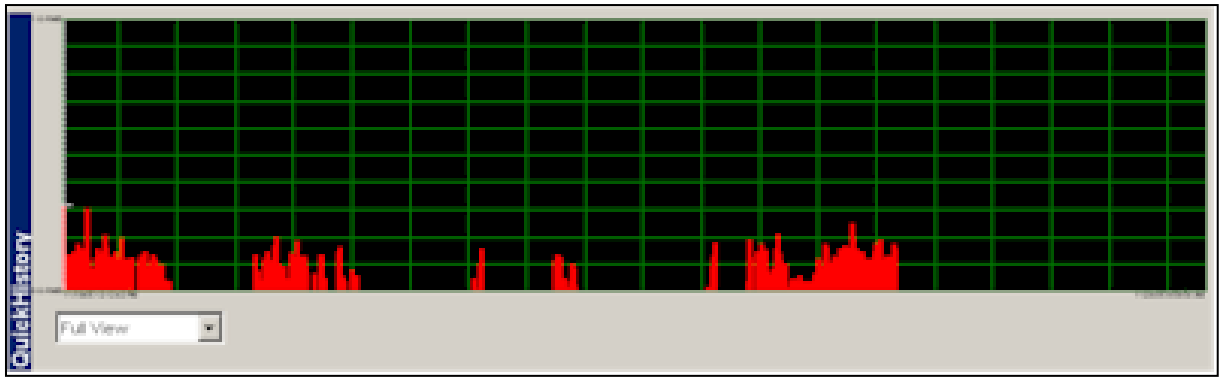
- SAVERs placed on fully assembled missiles, re-usable rocket segments
- Capture all shock and vibration events above user-defined threshold
- Ensure predetermined fragility levels are not exceeded during transport

SAVER™ Applications

Electronics - High-Value Shipment Monitoring

- Fixture a SAVER directly inside a shipment
- Sensitive electronics such as computers, printed circuit boards, and photovoltaics
- Ensure critical assemblies and components are not damaged during transport


Source: lifewire.com



Lansmont SAVER™ Instruments

Key Features - Hardware

- **Dual Measurement Modes.** Timer and event-driven sampling operate in parallel:
  - Event-driven acquisition. Programmable threshold trigger with full waveform capture.
  - Timer acquisition. Continuous trending of climatic data. Periodic dynamic data sampling also on 3X90, 9X30.
- **Signal Pre-trigger Data.** User-defined pre-trigger enables capture of data immediately prior to an event, ensuring the entire event is captured.

SAVER™ 3D15

SAVER™ 3X90

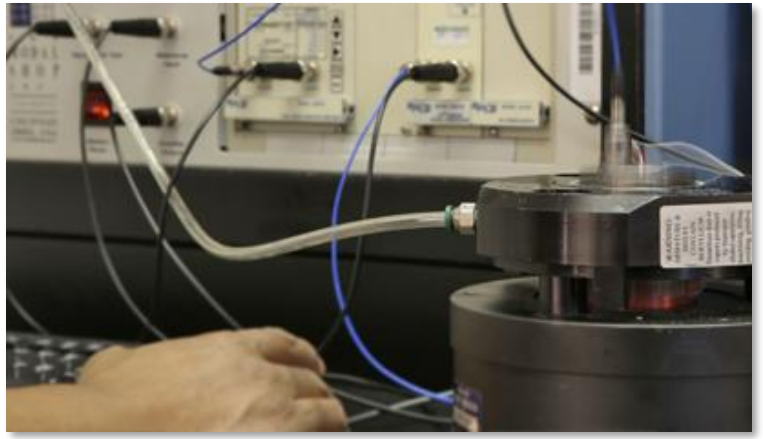
SAVER™ 9X30

SAVER™ AM

Lansmont SAVER™ Instruments

Key Features - Hardware

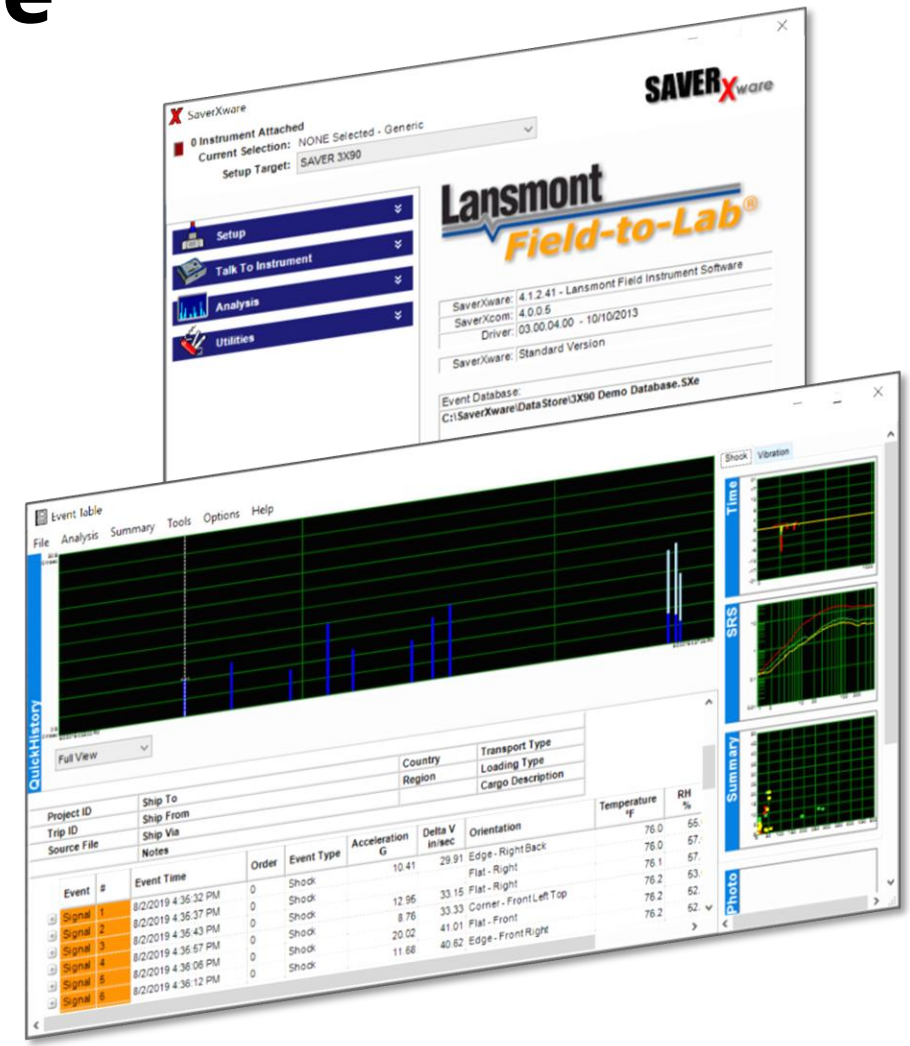
- **Accredited Calibration.** ANAB Accredited ISO/IEC 17025:2005 and ANSI/NCSL Z540-1-1994 professional calibration services.
- **Rugged Aluminum Chassis.** Natural frequency well above measurement range.
- **User-Replaceable Batteries.**
  No recharging necessary; full charge every time (3X90, 9X30, 3D15).



Lansmont SAVER™ Instruments

Key Features – SaverXware Software

- **Shock Analysis.** Acceleration waveform recording and calculated velocity change enable accurate evaluation of event damage potential.
- **Power Spectral Density (PSD).** PSD computation from vibration data for comparison to vibration profiles.
- **Shock Response Spectrum (SRS).** SRS computation from shock data for analysis of impulse frequency content.
- **Drop Analysis.** Calculation of equivalent drop height for free falls.
- **Automated Reporting**. Summary Report, Simple Health Report, Quick History



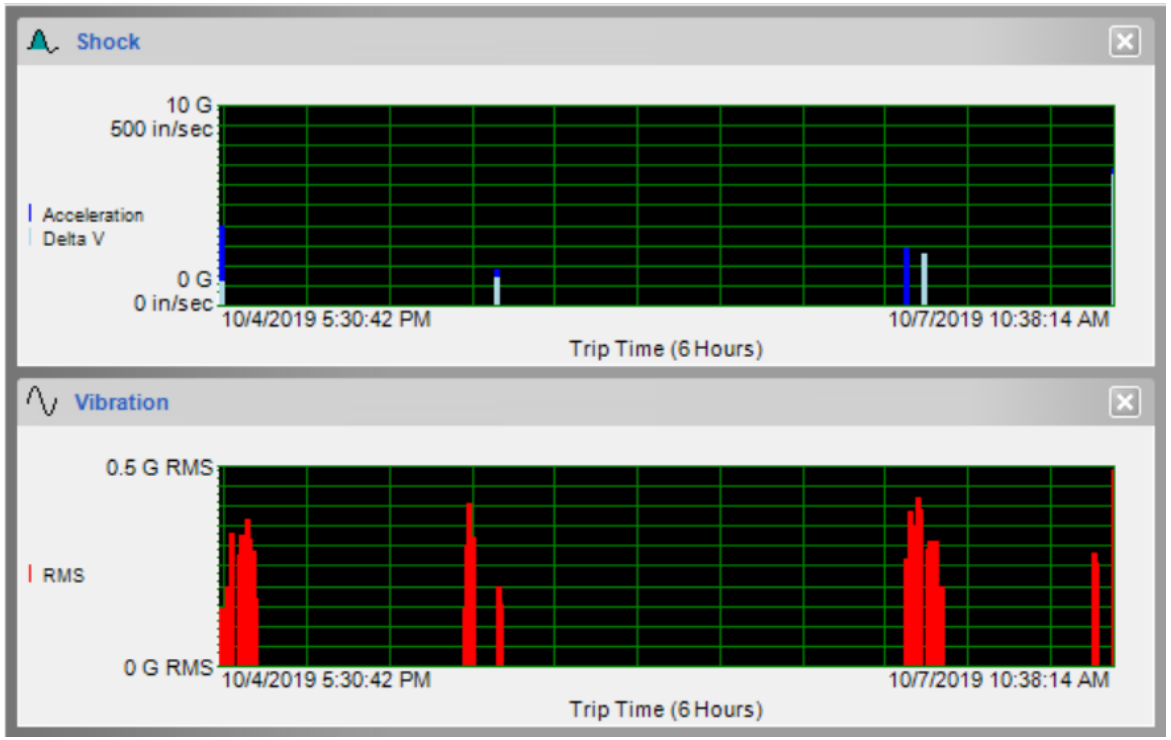
Lansmont SAVER™ Instruments

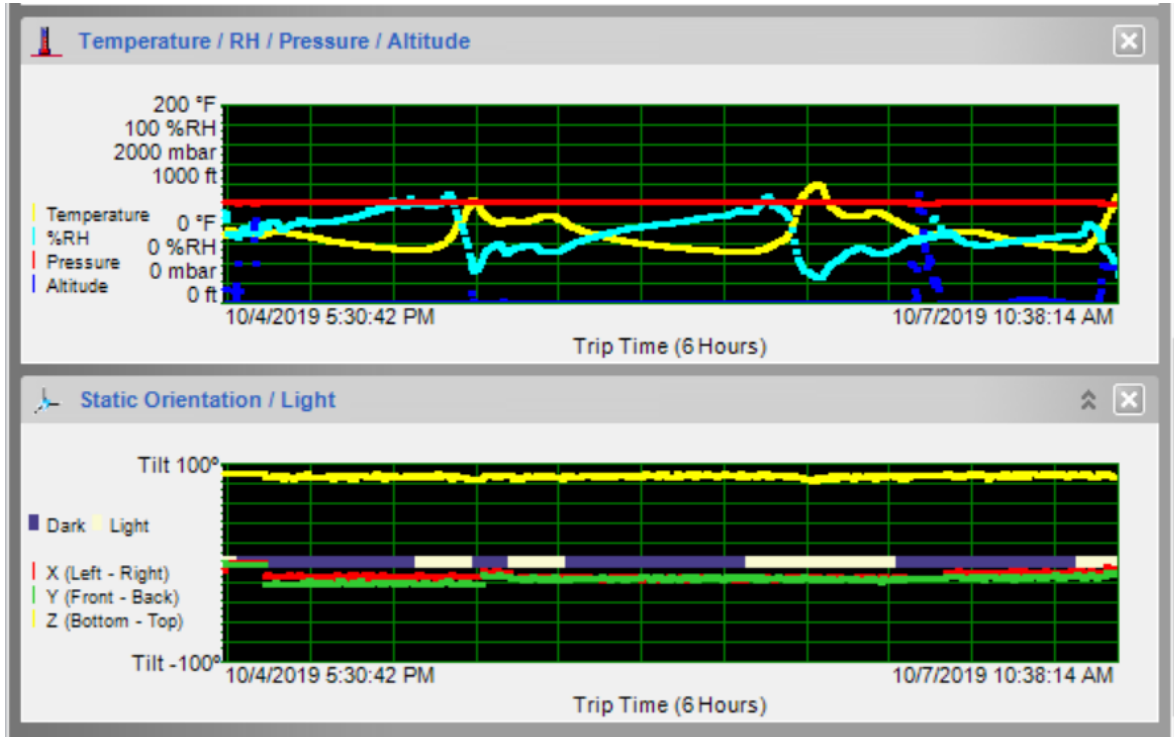
The New SAVER™ AM "Asset Monitor"

- Shock/impact and vibration waveforms
- Power Spectral Density (PSD)
- Temperature
- Relative humidity
- Atmospheric pressure
- Light sensing
- Orientation

Lansmont SAVER™ Instruments

The SAVER™ AM "Asset Monitor"





Quick History Graphs

Lansmont SAVER™ Instruments

SAVER™ 3M30+ and 3M30 Support

- SAVER™ 3M30+ is discontinued (SAVER™ AM is replacement)
- Calibrations – both models supported
- Repairs – as long as parts are available

Lansmont SAVER™ Instruments

Marketing Information

Lansmont Website – Field Instruments page w. download links for spec sheets:

http://www.lansmont.com/products/data_loggers/

Videos:

- SAVER Asset Monitor (AM)
- SAVER 3X90
- SAVER 9X30

Reference Material

SaverXware Tutorial Videos

https://vimeo.com/showcase/5305060