

Proven Performance in Physiologic Monitoring

THE GOLD STANDARD
in Chronic Physiologic Monitoring

DSI™



“DSI is a company that asks —
**‘what biomedical questions
do you want to answer?’** —
then unleashes a group of
talented engineers to create
innovative technological solutions
to help you answer
those questions.”

R. Dustan Sarazan, DVM, Ph.D.
Vice President, Strategic Planning
and Chief Scientific Officer, DSI

The best science starts with
the most reliable information,
and DSI is the “gold standard”
for researchers worldwide.

- All the top-50 pharmacology research companies use DSI products.*
- DSI products are used in more than 50 countries around the world.
- DSI telemetry data have been received from over 1,000,000 laboratory animals.
- DSI telemetry data have been collected from a wide variety of species of all sizes.
- Citations and research data have been published in more than 400 scientific journals, such as:

• *The New England Journal of Medicine* • *Hypertension* • *JACC* • *Circulation*
• *Science* • *Nature* • *Journal of Pharmacological & Toxicological Methods* • *Sleep*
• *Epilepsia* • *JAALAS* • *Journal of Physiology* • *European Journal of Pharmacology*

*Either directly or indirectly via a contract research organization.

1984: At this time, virtually all physiologic data are collected using tethers, cuffs, or restraints, sometimes while animals are under anesthesia

Paper charts are the "gold standard" of raw data recording; data are transcribed into computers for analysis. Acquisition and analysis software development begins

1989: Data matrix hardware is linked directly to computers, allowing direct acquisition of raw data and saving time while eliminating transcription errors

Paper charts become redundant

1984: DSI founded with five employees

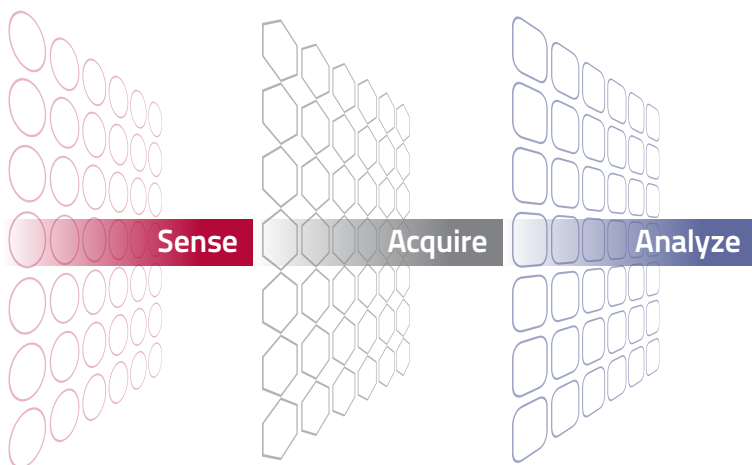
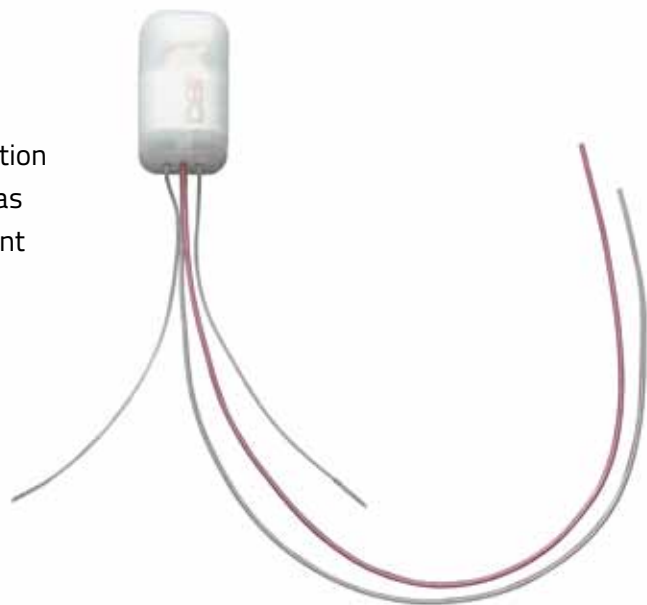
1985: First telemetry implant for temperature, biopotentials, and activity; acquisition and analysis software and hardware developed

1986: Ponemah™ founded; the first PC-based system that acquired and analyzed data in real time and continuously

1989: First telemetry implant for pressure measurement

Innovation Built on a History of Performance

- Expect innovation from a firm with a solid tradition of delivering high-performance products. DSI has earned its leadership position through consistent quality and dependable performance. It's why DSI products are used by the world's top drug developers. Don't compromise your study with shortcuts or untested applications.



An Integrated Platform that Accelerates Your Research

DSI's complete integrated platform generates information that, until recently, was not possible.

In addition, our partnerships with leading biomedical companies offer new solutions and opportunities to accelerate your research.

Sense

- Implantable or external telemetry
- Various combinations of physiologic parameters available
- Sizes for various species
- Respiratory chambers
- Tethered sensors too

Acquire

- Ponemah and Dataquest A.R.T. acquisition platforms
- Digital Amplifiers
- Synchronized telemetry, hardwired and video data
- Integrated third-party solutions

Analyze

- Ponemah Analysis Modules
- NeuroScore™
- DSI Reporting

1990s

1996: Benefits of implanted telemetry are so apparent that early adopters become converts and advocate to other research specialties

1999: Telemetry is considered the "gold standard" for animal research in broad applications

1992: First telemetry implant for BP, ECG, and temperature measurement

1994: First telemetry implant for large-animal ECG, arterial BP, and LV BP measurement

1996: Gould purchases Ponemah

1997: Introduced A.R.T. hardware and software data acquisition and analysis platform

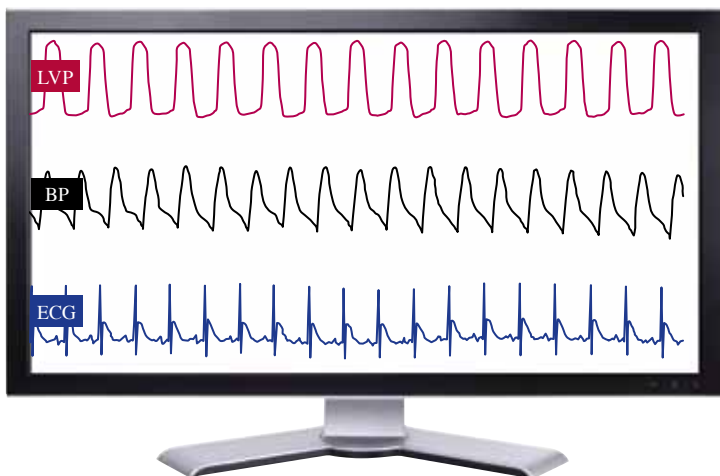
1998: First mouse telemetry implant for BP

1999: DSI begins collaborating with Ponemah (Gould)

2000s

More research. Better information. Accurate results. Saves you time and expense.

DSI's latest telemetry technology advancement is the PhysioTel HD platform, designed for use with high fidelity applications. The HD platform is based on a new chip design that supports the accelerated development of new transmitter technology — generating more research with less investment.



PhysioTel HD Transmitters

- Eliminate variability of data when collecting all data in a single study
- Smaller and optimized device shapes
- New catheter design supports applications requiring high fidelity
- Better pressure drift and frequency response
- More power-efficient
- More information; fewer animals

PHYSIOTEL **HD** TRANSMITTER

We recognize that researchers want improved monitoring tools to further accelerate and pioneer novel research. DSI is aggressively pursuing state-of-the-art technological improvements across our entire product line:

Moving Forward

- Synchronize all parameters – whether wired or wireless
- Increased sensor range, longevity, and higher density social housing
- New sensor types and more multi-sensor transmitters
- More powerful, easier-to-use analysis software
- Easily upgradable platform



2000: ICH S7A guideline for safety pharma *in vivo* studies states that data from unrestrained animals chronically instrumented for telemetry are preferable to data from restrained animals

2001: FDA adopts ICH S7A guideline

2005: AHA Scientific Statement guidelines for BP measurement in animals, providing specific recommendations and applications for implanted BP telemetry

2007: Data collection can be synchronized, continuous, multi-subject, acquisition of physiologic data, behaviors, movement, activities, and simultaneous video

2002: Ponemah becomes "gold standard" for GLP studies

2005: World's smallest telemetry implant for pressure measurement introduced

2006: DSI purchases Ponemah for fully integrated research platform

2007: DSI's JET™ (Jacketed External Telemetry) is introduced

2010: First respiratory telemetry implant
First dual-pressure rat telemetry implant

2010s

Proven

DSI™



DSI telemetry is helping researchers in over 50 countries around the world.

When coupled with world-class service and support, DSI is the best choice to meet the demands of today's researcher.

DSI—The Gold Standard

Look to DSI for monitoring, data acquisition, data analysis and reporting solutions for small, medium and large animals—all from a single, integrated platform.

DSI creates new research possibilities as the only single-provider of physiologic monitoring platforms capable of combining time-synchronous data collection from disparate sources. An abbreviated listing of DSI's data acquisition, analysis and reporting capabilities is as follows:

- **Cardiovascular.** HR and HR variability, BP, multi-lead ECG, LV pressure, cardiac volume, coronary and systemic blood flow, segment length and wall thickness, pressure volume loop analysis
- **Central nervous system.** Temperature, action potentials, activity, EEG, automated sleep scoring, FFT, periodogram, spectrogram, and power band frequency analysis
- **Respiratory.** Rate, volumes, max/min flow, resistance, compliance, PenH, breath times, from a wide variety of techniques including but not limited to implantable telemetry, RIP, head-in and head-out chambers, whole body chambers and a variety of anesthetized models.
- **Video.** Capture and synchronize video with physiologic data
- **Reporting.** Solutions for group means, standard deviations, and graphical capabilities within customizable Microsoft Word templates
- **Other applications include:**
 - Renal
 - Isolated organ
 - Muscular
 - Ocular
 - Gastrointestinal
 - Peripheral neural recording
 - And many more



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