



SENSORTRAN

4401 Freidrich Lane, Bldg. 307, Austin, TX 78744, USA | P: +1 512-583-3520 | F: +1 512-583-3565
Houston, USA | Richmond, USA | Southampton, England, UK

Introduction to SensorTran

SensorTran offers smart fiber optic-based Distributed Temperature Sensing (DTS) solutions for critical asset, industrial process and environmental monitoring that feature:

- Low lifetime cost of ownership
- Unmatched sophistication and performance
- Proven, rugged, and reliable designs
- High return on investment / strong value proposition
- Superior customer care and technical support

DTS systems measure temperature at all points along a fiber optic cable at distances ranging from 0-20 kilometers and can detect changes in temperature less than 0.01°C. Customers benefiting from SensorTran's technology include many the world's largest energy providers. DTS systems have applications in downhole oil & gas, transmission & distribution power cable monitoring, pipeline flow assurance and leak detection, process vessel hot spot detection, storage tank leak detection, geothermal monitoring and fire detection.

About SensorTran

Brief History

SensorTran began developing its core technology in 1996 for NASA's X-33 space shuttle program to monitor the integrity of internal cryogenic fuel tanks. These space-based roots afford SensorTran the unique distinction of being the only DTS manufacturer in the world to have space flight-qualified hardware. Initially as a division of Systems & Processes Engineering Corporation (SPEC, Austin, TX USA), SensorTran has been designing, manufacturing, and installing advanced fiber optic-based monitoring solutions since 1998.

In August 2006, SensorTran brought in \$5.5M in outside funding. These funds were used to grow the team, expand the product offerings, and spin out and establish SensorTran as an independent, privately-held, corporation. SensorTran's investors include Expansion Capital Partners (San Francisco, CA, USA), WHEB Ventures (London, UK), Advantage Capital (US), and Stonehenge Capital Company (Dallas, TX, USA). Over the last several years SensorTran has brought in two additional rounds of funding to support market expansion and new product introductions.

Facilities

SensorTran is the only US manufacturer of fiber optic-based Distributed Temperature Sensing systems. SensorTran's 10,000 sq. ft. corporate headquarters and manufacturing facility is located in Austin, TX and is home to approximately 30 US-based employees. SensorTran also has Sales Offices located in Houston, TX (USA); Richmond, VA (USA), and Southampton, England (UK).

Market Overview

With applications in asset, process, and environmental monitoring, SensorTran's DTS systems are integral to operating and maintaining efficient and safe production, process, storage, and delivery networks. SensorTran offers complete distributed monitoring solutions for a wide variety of applications across multiple markets such as:

Oil & Gas: production monitoring; flowrate measurement; water breakthrough; injection breakthrough; flow behind casing; gas lift valve performance; steam flood efficiency; SAG-D performance; inter-well connectivity; chemical injection monitoring; depth correlation; stimulation efficiency; and leak detection

Power Cable Monitoring: transmission and distribution line monitoring; substation monitoring; cable ampacity estimation; utility chase (tunnel) fire detection. DTS is a key Smart Grid-enabling technology.

Tank and Vessel Monitoring: LNG storage tanks; gasifiers; refractory vessels

Other: environmental monitoring (streams, geothermic activity); transportation tunnel fire detection; concrete cure (dams);

Vision

SensorTran believes that distributed fiber optic based sensing technology will revolutionize the way critical processes, assets, and resources are managed. SensorTran's goal is to provide smart solutions that deliver uncompromising performance at a price that drives widespread adoption. SensorTran will achieve this vision through superior:

Value: Consistently delivering unprecedented performance with a low total cost of ownership

Service: Rapidly responding to customer's needs on a worldwide basis

Flexibility: Constantly listening to our customers and partners to deliver smart solutions quickly

SensorTran is committed to providing smart DTS solutions with low Lifetime Cost of Ownership. With the best value proposition in the industry, SensorTran is able to offer highly effective, sophisticated monitoring solutions at a competitive price. SensorTran is committed to superior customer care at every level of the organization. In the past, specifying, purchasing and deploying DTS systems has often been a complex endeavor. The SensorTran team strives to ease DTS adoption and implementation through superior design, practical installation assistance, and the most knowledgeable fiber experts in the industry. SensorTran is an active participant in organizations such as SEAFOM, Energistics, and GridWise. SensorTran has been a steady proponent of the adoption of a common vocabulary and standardized specifications to help improve customer's understanding and assure effective implementation of DTS technology.

Technology Horizon

SensorTran continues to leverage its core competencies to introduce state-of-the-art fiber optic-based distributed monitoring solutions. In addition to on-going revolutionary enhancements to DTS, the company is looking forward to delivering distributed strain, pressure, and corrosion sensing products. These products will incorporate the same smart design principles as the DTS systems, providing the required performance at the right price.

Products Offerings

SensorTran offers four families of DTS products as well as a variety of communication options, packaging modules, optical fiber cable and ancillaries which, together, add up to complete solutions for a diverse range of applications. SensorTran's DTS products have an integral Ethernet-ready computer with effective networking and open communications architecture and multiple channel capability.

Gemini

Gemini™ DTS systems with PerfectVision™ multi-laser technology are quickly becoming the de-facto standard for downhole monitoring in Oil & Gas applications. The Gemini™ platform marries SensorTran's second generation PerfectVision™ technology with several other proprietary innovations to create the world's most powerful Distributed Temperature Sensing (DTS) system. Gemini™ has a streamlined architecture that features two-1U modules – the first housing the data acquisition and processing functions, the second containing the lasers and optics. Each of the modules can be upgraded to increase measurement speed, laser intensity (optical budget), or both. The Gemini family includes both single mode and multimode systems.



Gemini™ Data Acquisition & Optics Modules
(19" Rackmount)

Astra

Astra™ is a compact and reliable single-laser DTS system that offers fast and repeatable measurements. Astra™ is configured to be used with standard multimode optical fiber and supports up to 16 internal channels in a 3U rackmount design. Astra™ has a range of 5km, spatial resolution of 1m across the entire measurement range.



Astra™ 3U
Rackmount



SensorTran's Lynx™ family of fiber optic-based sensors offers Distributed Temperature Sensing (DTS) and Fiber-Bragg Grating (FBG) point sensing capabilities in one package, with one interface. By marrying the performance of SensorTran's Gemini™ DTS platform and Micron Optics' Bragg Interrogator, customers now have access to a fully integrated, highly reliable sensing solution. For the first time, projects requiring distributed temperature, pressure, strain, and/or vibration measurements can be completed by deploying a single system. Lynx™ is compatible with a wide range of third-party Bragg Grating-based sensors. FBG sensors can be deployed in either single point or multipoint schemes. Lynx is ideal for applications such as: production monitoring in O&G wells (DTS and single/multipoint pressure sensing); joints on power cables (distributed and multiple-point temperature sensing); oil-filled cables (DTS and multiple point pressure sensing); subsea risers and equipment (DTS, strain, pressure, and vibration); structures such as bridges and dams (DTS, vibration, and strain).



Triton™ is a cost-effective portable Distributed Temperature Sensing (DTS) system that offers fast and repeatable measurements. Triton™ is configured to be used with standard multimode optical fiber and supports up to 4 internal channels in a compact, portable, shock-mounted case. Each Triton™ FieldArmor™ package contains an optics module, a data acquisition module and an integrated screen and a keyboard. Triton™ systems provide accurate temperature measurement points every meter up to a range of 4km. Triton™ is SensorTran's newest product offering and was developed specifically for earth and life sciences applications.

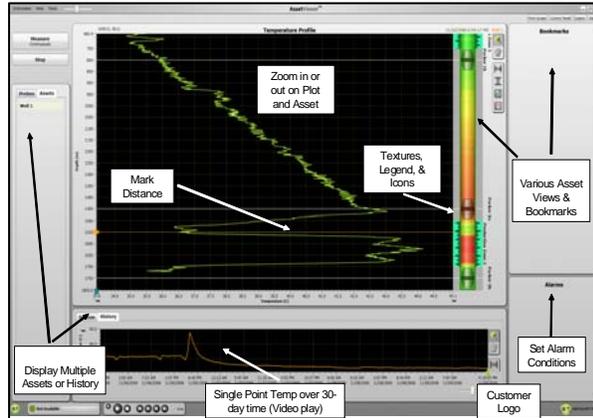
Software

SensorTran's software suite is comprised of four different product offerings as follows: DTS Commander™; DataViewer™; AssetViewer™; DataFuser™

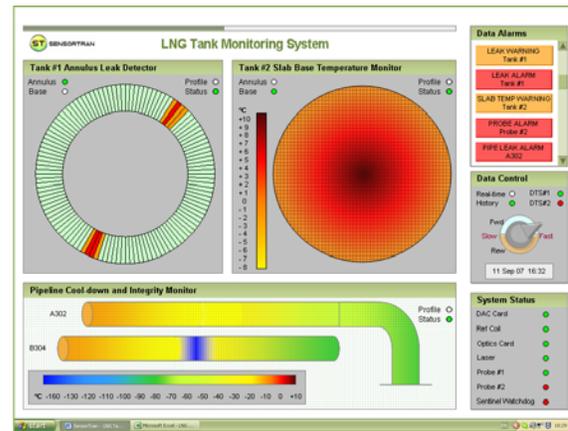
DTS Commander™ houses all the command and control functions for the DTS system and provides for basic data visualization. DTS Commander™ is required for operation and ships standard with all units. Each of the other software offerings' work in conjunction with DTS Commander™ to provide advanced data display and data integration functionality. Data

The SensorTran software suite provides a powerful, user-friendly, interface for DTS configuration and operation. Aside from command and control functions and data visualization, the software includes several special features. **Recalculation Tools** allow the user to simulate scenarios in advance of making changes to compare outcomes. The **Historical Playback** feature allows users to review standard temperature traces over time using the data control facility. All SensorTran software can be accessed, upgraded, and worked on remotely by users and/or SensorTran personnel as required. The **Remote Access** features are the cornerstone of SensorTran's superior field support services - as they allow for in-situ customization and configuration by SensorTran experts.

Data Visualization in AssetViewer™



Wellbore Monitoring



LNG Tank Monitoring

Summary of Technical Advantages

PerfectVision™ Multi-laser Technology

This proprietary second-generation multi-laser technology simplifies calibration and automatically corrects for the effects of fiber damage over time and damage occurring during fiber installation. PerfectVision™ Accounts for splice and connector losses as well as induced strain effects (attenuation) and eliminates the need for double-ended measurements.

Active “Plug and Play” Continuous Calibration

SensorTran’s advanced software capabilities, combined with proprietary technologies encompassed in PerfectVision™ and the Calibration Module enable the industry’s first true “Plug & Play” DTS system. For DTS, “Plug & Play” refers to the ability of the system to automatically and continuously maintain calibration - even as the characteristics of the fiber optic probe change over time.

Fastest Measurement Speed - SensorTran’s superior signal-to-noise ratio provides the fastest measurement times in the industry.

Long Range Capability and Superior Spatial Resolution - SensorTran’s DTS systems have the highest optical budget in the industry – which both improves performance and extends the range of the systems. The large optical budget also ensures proper performance when using fiber optic cables with numerous splices and other loss-inducing characteristics.

Industry Award - SensorTran DTS systems have the best performance available in the industry and are the honored recipients of the 2006 Frost and Sullivan North American Product Innovation Award for Distributed Temperature Sensing.