



**SEERTECHNOLOGY**<sup>®</sup>  
SEE WHAT CAN'T BE SEEN

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# AccuSense<sup>®</sup> Origins and Technology

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*“Having no detector is better than having a poor detector”  
Gary Bodily, SEER Technology, Chief Technology Officer*

This is the conclusion Gary Bodily reached after a fifteen year career at the U.S. Army Dugway Proving Ground where he was dedicated to the mission of conducting testing, training and operations assessments following the highest scientific and technical standards.

Gary’s experience at Dugway proved to him that the state-of-technology chemical detectors available to him provided information that was incomplete to the point that decisions made based on this information ran a high probability of being wrong. To Gary this was unacceptable for key tools in a “keeping the population safe” mission.

Gary’s experience was that detectors designed to detect a pre-determined chemical set only provided decision makers with a binary data set – yes or no – a gas had been detected - and even this data set had a high probability of being inaccurate. The key information of *what* had been detected and *how much* was in the atmosphere was not available to him. For Gary, *“not providing information about all of the chemicals present is of little value and can potentially exacerbate a dangerous situation”*.

The paradigm needed to be shifted from asking the question: *“Is there X in the air?”* to making the statement: *“The air contains A, B, C ... X, Y, Z at these concentrations.”* To achieve this objective, Gary envisioned a broad spectrum detector that was designed to be a non-biased estimator of chemical composition. With accurate identification of multiple chemicals and by providing the concentrations of those chemicals at low detection limits, a high value response decision could be made.

In 2005, realizing that the private sector offered the best opportunity to achieve his vision, Gary left Dugway and teamed with fellow chemical detection and analysis expert Neil Arnold and businessman Lance King to found the company that would become SEER Technology in 2008. In 2008, Kurt Dobson, an IEEE Engineer of the Year in 1997/1998, and Dr. David Dobson, winner of the Felix Klein prize from the European Mathematical Society in 2000, joined SEER to develop the neural network algorithms for processing chemical spectra data that proved key to productizing the AccuSense Chemical Recognition System. Fred Gallander, CEO, also joined the company in 2008, providing invaluable capital and the experienced business leadership acumen required to bringing products to market.

Design parameters for AccuSense included:

- Un-biased detection, identification and analysis capability across families of chemical compounds, i.e., Toxic Industrial Chemicals (TICs)
- Highly accurate analysis with results presented in a time frame and a context that maximized the value of information
- A portable form factor that could be deployed as a simple-to-use field utility device
- A flexible hardware and software architecture to respond to the differing requirements of the end-user community



### AccuSense Chemical Recognition System

Gas chromatography was identified as the only chemical analysis technology capable of meeting these parameters. The challenge was turning what was almost exclusively a laboratory device into a field utility device. To do this, the design team developed proprietary solutions in the following six key areas:

#### Technology

- *SEER solution:* Dual-Hyphenated Gas Chromatography (DHGC) chemical separation technology that implements a patented GC winding methodology and provides 2-Dimensional analysis of gases
- *Benefit:* Maximizes chemical separation to minimize false positives and allows for implementation in a small, lightweight, low-cost package

#### GC Valves

- *SEER solution:* Eliminate typical GC valves by designing a patented manifold that prepares samples for analysis without bulky and expensive valves and eliminates moving parts along the analytical path
- *Benefit:* Major cost reduction with no performance impact

#### Elute Gas

- *SEER solution:* Eliminate the need for a consumable elute gas by enabling the use of ambient air for this function
- *Benefit:* Remote fixed continuous monitoring without the need for human interaction with the device

#### Sensors

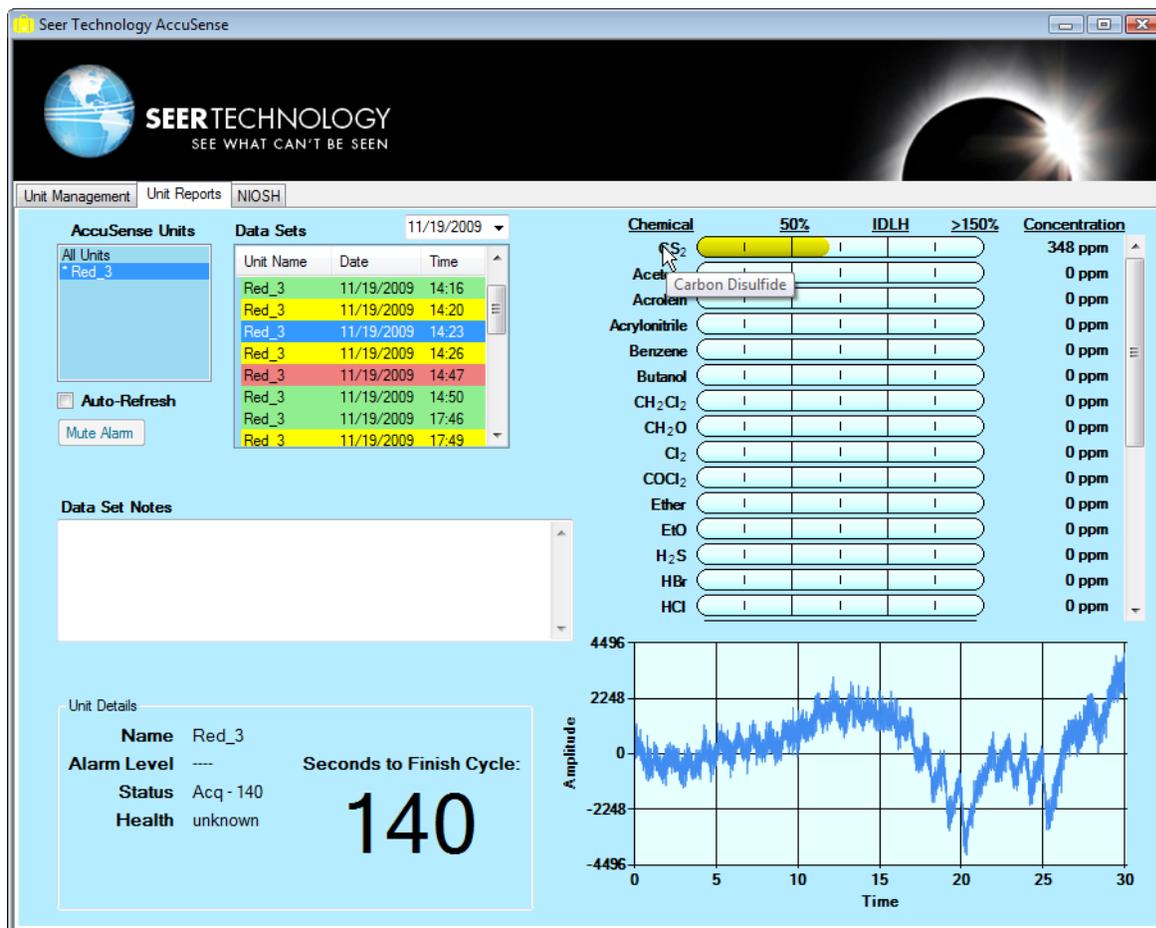
- *SEER solution:* A patented thermal sensor for chemical identification after separation portion has been completed
- *Benefit:* Enables a broad spectrum of chemicals to be analyzed while maximizing the accuracy of the DHGC separation system

## Analysis Integrity

- *SEER solution:* Proprietary algorithms implemented using neural network technology to deconvolute detector response from input
- *Benefit:* The mathematical characterization of chemical compositions as 3D pictures significantly reduces false positives and negatives and enables the creation of unique, high integrity chemical signatures for identification and quantification of detected compounds

## Context

- *SEER Solution:* Integrated communications capability to transmit AccuSense data to a remote PC monitor hosting the AccuSense Graphical User Interface (GUI) that displays analysis results in a format that is of high value to the end user
- *Benefit:* Availability of high value information in easy-to-read graphical format, separate from the detection process, enables remote monitoring and enhances usability (No PhD required) and deployment options



AccuSense GUI - Unit Reports Tab

In July 2010 the AccuSense Chemical Recognition System will progress into mass production. The first release of AccuSense addresses Immediately Dangerous to Life and Health (IDLH) chemical detection applications and implements a chemical signature database based on the most readily available and hazardous to human health TICs.

The chemical detection paradigm has shifted; no more does chemical detection mean linear observation against a predetermined data set. AccuSense brings end users high value decision information generated by multi-dimensional analysis of chemical composition against a database of high-integrity chemical signatures.

Now end-users can truly ***See what can't be seen!***

## About SEER Technology:



SEER Technology, Inc., headquartered in Salt Lake City, UT., has developed tactical personnel tracking and chemical recognition products for use in Immediately Dangerous to Life and Health (IDLH) situations in First Responder, Public Safety, Government and Commercial markets. These products allow customers to “See What Can’t Be Seen” to protect lives and increase productivity in dangerous environments.

The NAVISEER® product is a Precision Personnel Tracking system used by on-foot personnel in GPS-denied areas, such as inside buildings, tunnels, caves, mines, etc. NAVISEER combines an on-board GPS with a precision Inertial Navigation (INS) system which takes over when GPS is unavailable and communicates through existing radio systems and GSM cellular networks.

The NAVISEER Precision Personnel Tracking system includes SEER3D™ visualization software. SEER3D allows rapid geo referencing and wireframe extrusion of any building on earth so that commanders can see and command their tactical deployments in real-time.

AccuSense® is a lab quality, portable Chemical Recognition System based on dual-hyphenated gas chromatography technology which identifies up to 16 different chemicals simultaneously, along with the concentration level of each chemical. AccuSense works on a 3 minute sample cycle, uses no consumables, and operates both as a fixed location continuous operations unit and as a point detection solution.

For more information please visit the company’s web site at: [www.seertechnology.com](http://www.seertechnology.com)