

Think Thermally[®]

May 2002

Practical news for practicing thermographers

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A Little White Lie

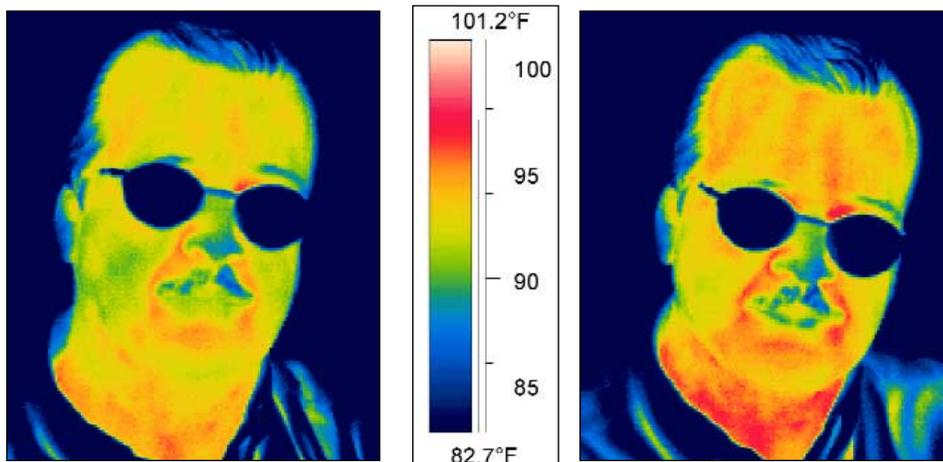
Have you ever tried to get away with a little white lie? Maybe you've answered "Not me" when your spouse asked, "Who ate the last piece of cake?" Someone may soon be able to actually see that lie in their thermal imager.

Groups from Honeywell Laboratories and the Mayo Clinic have done research and testing using a high-definition thermal imager (with a sensitivity of 0.025 degrees C) attempting to detect when people lie. It seems that when people lie there is regional facial blood flow changes around the eyes.

In one example of testing, researchers set up a crime scenario. Some test subjects

committed a crime while a control group had no knowledge of the events. The research found that 75% of the guilty people were correctly categorized and 90% of the innocent people were correctly identified. These numbers are in line with the success rate of the more traditional, established test method of a polygraph.

The hope is to use thermography for detecting psychological responses in a variety of mass screening situations without having to have physical contact with the subject. So, the next time you tell your spouse a little white lie, make sure your imager is off and in the case!



Previous student and Thermal Solutions[®] presenter, Bobby Fogle, caught in the act of lying. The image on the left shows his normal facial thermogram, and the image on the right shows the temperature changes when he lied. Photos courtesy of Scott Newman.

Changes for DuPont's Infrared Program

When you think of integrity, family, people, DuPont, electrical safety, good manners, golf, duck hunting and thermography, you think of Lowry Eads. This is a man with a quick smile and a bit of the King's English in his otherwise Southern drawl that betrays his growing up in Richmond, Virginia. As of May 1st, you can add "retirement" to the list.



Like many his age who served in the armed forces, Lowry Eads first used infrared in the Far East on a riverboat. As a specialist at DuPont's Spruance site in Richmond, Virginia, he encountered the technology again later. The site, which manufactures Kevlar® and Tyvek®, relies heavily on the thermographic work of the spry 58-year-old. The truth is, it will probably take two people to fill his shoes. The corporation as a whole has also leaned heavily on him in recent years. Lowry has served as the head of the Infrared Leadership Team since 1994, as well as being a member of the Corporate Electrical Safety Team. In both capacities, he has been widely respected for speaking his mind while listening to the needs of others. As a result, he has had considerable influence on how thermography is being used at DuPont and has helped shape the corporation's mission for improving electrical safety in the workplace.

"People ask me how I can be so adamant about safety," says Lowry. "It's simple! I just reply with 'Asking me to compromise my values for safety would be asking me to not care about the quality of your life.'" The discussion, if it needs to continue after that, is generally productive and on purpose.

During the mid 80s DuPont invested substantial resources to establish infrared thermography. This was primarily to ensure their processes ran reliably and safely. DuPont's thermography program has become the benchmark in the industry and was one of the first to have a certification program that fully complied with ASNT standards. The present level of strong support indicates that most believe the investment has paid off handsomely.

"Although I'm moving on, I know the Thermography Leadership Team will continue to promote infrared," Lowry said. "Lois Broecker has stepped into the leadership position for the team and I have every confidence in her abilities." It is likely Lowry will continue to use the technology, as a consultant, but definitely for less time than the 60–80 hours per week he has been putting in for the last few years.

Like many on the verge of retiring, Lowry is not 100% sure what the future looks like. He is sure he won't play golf every day. "I love the game too much for that," he quips. One thing is certain—even if he never picks up another infrared camera, he made his mark in the industry by raising the bar for many thermographers and helped to make their work safer and more effective.

Letters to the Editor

Good thermographers pay attention to detail. Day-in and day-out they examine various images searching for what might be wrong. Readers of *Think Thermally* are no exception! In the March 2002 issue we wrote about the new wind chill chart that has been developed and was implemented last year.

It didn't take long before several readers wrote to tell us about the discrepancy between the wind chill chart and the accompanying text. Russ Wallace of BAE SYSTEMS wrote, "I know you guys hate to receive email like this, but your wind chill examples in the newsletter don't match the new chart. ... Did I not use the chart correctly?" ALCOA thermographer, Gary Wiggins emailed, "I just received the latest issue of *Think Thermally* and as usual was in the process of reading and re-reading it when the chart on page five kind of jumped out and bit me (pun intended). ... Keep up the otherwise excellent work."

All of you are correct—the text and the chart did not match up. The chart was correct, but the text was incorrect. As mentioned in the article, that particular day in Vermont it was 10° F with a 40-MPH wind (making it –15° F). I happened to be outside just prior to writing the article, helping my son with his new snow fort. I obviously didn't wait long enough for all my body parts to thaw and "frostbite of the brain" took over. My apologies to *Think Thermally* readers for any confusion my oversight caused. Thanks for being so observant and keeping us on our toes!

–Editor

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Thermal Solutions®

January 27–30, 2003 Tampa/Clearwater Beach, Florida

Call for Papers: Abstract due date June 21, 2002

Snell Infrared is pleased to announce Thermal Solutions® 2003, a professional conference for infrared thermographers. This conference is open to *all* thermographers, regardless of equipment preference, previous training or company affiliation. During the conference, two separate tracks of papers will be offered and will run concurrently: *Condition Monitoring/Reliability* and *Nondestructive Testing*.

We are requesting papers for both tracks...

Condition Monitoring/Reliability

We are looking for papers in the following areas: Condition monitoring, building diagnostics, applied R&D, spot radiometers, process monitoring using IR and program management.

Nondestructive Testing:

We are looking for papers in the following areas: NDT applications using thermography in locating structural defects in aerospace, automotive and industrial materials. Applications in this track will range from field inspections to fully automated NDT processes.

Interested presenters should write a brief abstract and submit it for review by June 21, 2002.

We require all papers to be non-commercial in nature. All abstracts will be reviewed and selected by the conference steering committee. All papers will be published in a Proceedings and available at the conference. Details regarding format, presentation, etc. will be included in the author's kit you receive upon acceptance of your abstract. To compensate you for your presentation we will discount the conference fee from \$975 to \$295.

- ◆ Further information about the conference is available on the web at <<http://www.thermal-solutions.org>>. Please call 800-636-9820 or e-mail <info@thermal-solutions.org> if you have any questions.
- ◆ Send abstracts to: Thermal Solutions®, P.O. Box 6, Montpelier, VT 05601-0006 or e-mail abstracts@thermal-solutions.org

New Courses New Courses

Snell Infrared is pleased to announce *four new courses*. These *specialty courses* are for people who have had training or extensive experience already. If you have been looking for a way to further your skills and knowledge, need in-depth knowledge on a particular application and want to stay current in your profession and industry, these courses are for you!

- ◆ **Mechanical Applications**
- ◆ **Analyzing Products & Processes**
- ◆ **Electrical Applications**
- ◆ **Building Applications**

The specialty courses are being held in Toronto and Detroit this year. Already, we have had two successful courses. Brian Jastrow, President of Infrared Imaging Solutions, Inc. attended the Mechanical Applications course in Toronto. This is what he had to say about his experience: *The hands-on work in this class was invaluable; the course content just what I needed. Thanks for all the useful information. This was a great course.*

These two-day (Wednesday and Thursday) courses are available for \$750. There is an optional theory review available Tuesday before each course. The review by itself is \$375; all three days are only \$995. Take the opportunity to further yourself in thermography by joining a room full of experienced thermographers delving into applications with the undisputed expertise of Greg McIntosh. The dates of the remaining 2002 courses are included in the course schedule listed on the back page. Call today to let us know that you plan to attend!



Why upgrade?

Unlike computers, older infrared equipment is usually not obsolete. Some failed to make the Y2K cutoff and parts are not available for others, but even an old VideoTherm® or Probeye®—if working properly—can still give useful thermal data. In a few cases, of course, old technology actually works better than new! Why, then, should a thermographer consider upgrading to one of the many, remarkable new cameras available?

Smaller and lighter are two very important reasons. While scanning systems with battery packs once weighed close to twenty pounds, most of today's camera systems weigh less than five. Fatigue is dramatically reduced, as are repetitive-use injuries. The backaches and sore arms thermographers have put up with for years can be a thing of the past.

Batteries now last longer and recharge more quickly. That means you can be more productive.

The increase in both spatial and measurement resolution provided by today's Focal Plane Array (FPA) systems is also phenomenal. It means we can see much greater detail and measure radiometric temperatures of smaller objects from further away. Both are huge advantages over older systems.

The primary reason to upgrade, however, is plain and simple: **improved personnel safety**. Electrical thermographers, in particular, need to minimize the time they spend in front of open enclosures and energized equipment, so the ability to store a 12- or 14-bit image is a big plus. Large dynamic ranges mean you can literally focus and capture the image, leaving the fine tuning of level and span adjustments for later when you are out of harm's way. Using older 8-bit technology required all image adjustments be made prior to storing the image. Data is also stored more quickly on electronic cards rather than floppy discs or videotape. That means you are in potentially dangerous situations for longer periods of time.

No capital expense is made lightly these days, but investing in a new infrared system can pay large returns. You should at least look at new products, and consider that a whole new crop of fully featured cameras is now available, especially under the \$25,000 range. If you need help evaluating your needs or matching them up to existing equipment, give us a call. As always, we remain completely independent of sales. Our job is to serve your needs. Frankly, that is one of the reasons we strongly recommend you upgrade!

Should You Buy an Imaging System or a Spot Radiometer?



Many people exploring the idea of investing in thermography debate the relative merits of spot radiometers versus imaging systems. Either tool, if used appropriately, can help to provide returns in a well-developed maintenance program. Don't become confused, however, as to how each can best be utilized. The table below details some of the differences between these devices.



Device	Spot Radiometer	Imaging System
Cost	\$100–\$1,500	\$12,000–\$60,000
Waveband	Various	LW or SW
Spot size	As small as 60:1	As small as 300:1
Emissivity correction	Some	Yes
Background temperature	No	Yes
Data storage	Limited	Yes
Image	No	Yes

Thermal imaging systems have the advantage of quickly inspecting large areas, complex machinery or numerous or small components. These tasks are simply not possible with a spot radiometer since it has no image.

Radiometric imaging systems typically make it possible to measure temperatures more accurately, especially from a distance. Their much smaller spot size, a measure of spatial resolution and the ability to set both emissivity and background temperature

correction factors give them a distinct advantage over spot radiometers.

An excellent place to include spot radiometers in a successful infrared program is after an imaging inspection. Because of its lower cost, the tool can be made easily available to electricians checking repairs to problems that were found. Studies show that up to 50% of repairs may not be successful the first time—a risk minimized by a quick follow-up check.

Many people think spot radiometers, because they are relatively simple to use, require no operator training. Nothing could be further from the truth. Their simplicity is, in fact, very deceptive! Failure to understand the limitations of spatial resolution can result in unreliable measurements. Laser aiming devices that also define the measurement circle are highly recommended.

If you need help deciding which of these two great tools you need, give us a call. If you like, we'll also put you in touch with the companies that sell them. Best of all, we'll help you learn to use them correctly so you get the greatest return possible on your investment.

Infrared tips for the week

MONDAY During any scheduled shutdown of a system in your plant, plan to install high emissivity targets on your low emissivity components. This will allow you to make very accurate radiometric measurements any time you need them. Without these targets, you have little assurance of accuracy and repeatability. Targets may consist of paper stickers, painted spots, or electrical tape. Whatever you use should first be passed by your safety committee. Place the target near any electrical connections or in any areas where you want to make periodic measurements.

TUESDAY While it is great to see invisible infrared radiation, don't forget your eyes. Confirming a thermal signature with a pattern of visible damage is powerful. While many "hot spots" are not obviously visible on their own, once you know where to look you will often be rewarded with validating information.

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WEDNESDAY Not sure if the surface you are looking at is reflective? If you can do so safely, put a piece of electricians' tape on it. If the tape looks different than the surface, the surface is probably fairly reflective. Knowing that, you should be very cautious about any measurements you make.

THURSDAY Check the neck strap on your camera today. Often we see them worn to the point of failure. If you need a new one, visit a local professional camera store and buy one of the many high quality straps that are currently available.

FRIDAY Most cameras in use these days store the thermal data on a PCMCIA card of some sort. These little wonders can hold literally hundreds of images. But they are not fool proof. Keep them clean and, like any magnetic storage media, don't get them near magnetic fields. Even though they are not inexpensive, I always make sure I have an extra with me. Few things are more frustrating than being in the middle of a job when the card is full or won't work properly.

Snell Infrared Remaining 2002 Course Schedule

Level I

June 10–14, Montpelier, VT
July 15–19, Minneapolis, MN
August 12–16, San Diego, CA
September 9–13, Montpelier, VT
October 7–11, Cincinnati, OH
October 21–25, Toronto, Canada
November 4–8, Dallas, TX
December 2–6, Montpelier, VT

Level I Review Course with Certification Exam

August 13–15, Montpelier, VT

Level II

June 3–7, Montpelier, VT
September 16–20, Indianapolis, IN
October 28– November 1, Toronto, Canada
November 4–8, Dallas, TX

Level II Review Course with Certification Exam

August 20–22, Montpelier, VT

Level III, Best Practices

September 24–26, Montpelier, VT

Specialty Courses

Toronto, Canada:

September 25–26, Electrical Applications
November 13–14, Building Applications

Detroit, Michigan:

October 9–10, Mechanical Applications

Thermal Solutions®
January 27–30, 2003
Clearwater Beach/Tampa, Florida

**Level III Prep Course taking place
June 25–27 in Montpelier ...
call 800-636-9820 for details!!**

Snell Infrared 

Training, Certification and Support for Thermographers

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