

# Think Thermally<sup>®</sup>

March 2003

Practical news for practicing thermographers

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**“Wow what a great week it was! My depth of thermal understanding has grown considerably thanks to the amazing symposium the Snell staff organized with the contributions of so many technology and industry professionals...Snell really delivers in quality and quantity!”**

*Jan Van Zelfden*



## Thermal Solutions<sup>®</sup> 2003: A Great Success!



The four previous Thermal Solutions<sup>®</sup> conferences were successful by any standard. In 2003, with more than 200 people attending the opening dinner and participating in the events of the week, we re-defined success and exceeded our expectations! For some, the Sunday golf scramble was the perfect way to start the conference, even if no one took the \$100,000 prize for a hole-in-one.

For others, things got underway with the six short courses offered on Monday. Attendance at all of them was stronger than ever this year.

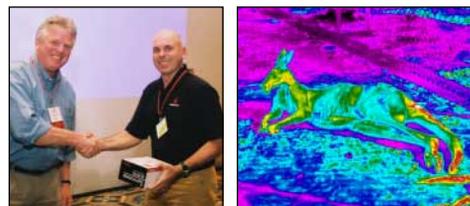
Twenty vendors, including all the major infrared camera manufacturers, opened their exhibits Monday at noon and drew strong, steady traffic all day. They closed briefly for the kickoff dinner and opening presentation by Chuck Hellier. Chuck is one of the

greats of the Nondestructive Testing (NDT) world. His presentation reviewed the role NDT had played throughout history in making our lives better and safer and was very well received.

The Conference Steering Committee was honored for their continued



work in helping to shape the conference professionally. Winners of the Image Gallery contest were also awarded. Gary Calvert of Thermoscan Inspections, Ltd., took first place honors (his prize was a set of image-stabilized binoculars) with his thermal image of a kangaroo.



*Gary Calvert of Thermoscan Inspection Service, Ltd. in Australia won the grand prize in the Thermal Solutions<sup>®</sup> Image Gallery contest.*

Tuesday morning's keynote address by Dennis Belanger of Management Resources Group challenged participants to create a business model for infrared NDT and maintenance programs. Dennis argued persuasively that doing so was the only way we will continue to grow and have the kind of impact thermographers all know is possible.

Presentations on Tuesday continued with split sessions of NDT and Condition Monitoring (CM), both of which were well attended. CM presentations included using thermography at US Embassy facilities around the world, the use of infrared in the maintenance of a steel mill, the combined use of IR and vibration for HVAC equipment and details of work being done at an automotive plant and an aerospace engine plant. In the afternoon, the floor was opened to IR equipment vendors to share facts about their products and their innovations with participants. Gary Calvert ended the day with

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Conference, continued from first page

his fascinating presentation of how IR is being used “down under.”

In the NDT track, presentations included thermography as a tool for process monitoring and predicting the failure of powder metal parts, temperature measurement and thermal NDT, thermography of aerospace components, batch processing of thermographic NDT data, time rastered thermography and thermal identification of argon depletion in high performance fenestration.

Ron Predmesky, of Ford Motor Company’s, Science Research Lab captivated the audience Wednesday morning with stories and images of race cars, production lines, tire testing, America’s Cup boats and numerous other applications of the technology.



Presentations continued in both tracks that day. The NDT track hosted an extended, hands-on demonstration of pulse-active thermography by Bharat Chaudhry of Thermal Wave Imaging. During that session, attendees were able to actually use a system to test various material samples. On the CM side of the conference presentations included four relating to power generation equipment, one about the inspection of ships and a fascinating presentation of the use of IR and corona detection cameras in the business of cleaning the high- and medium-voltage electrical equipment.

Wednesday afternoon found nearly all participants off on one of two field trips. The buses took attendees either to the Museum of Science and Industry or the Clearwater Aquarium. John Snell worked with the facilities veterinarian at the aquarium to make a short presentation about how IR is used for animal health applications.

Phil McMullen of Thermo-scan Inspections, and Rob Spring and John Snell, both of Snell Infrared, kicked off Thursday morning with a lively panel discussion on using infrared for residential scale buildings. The panel fielded many noteworthy



questions. A wide variety of presentations made up the last session of the conference. Thursday’s presentations included one on making a business case for the technology, another on the use of infrared in Antarctica, an overview of archeological

## Letters to the Editor



### Nunavut: NOT a province!

Just a bit of clarification from a Canadian thermographer. Nunavut, strictly speaking, does not hold the status of a Province and is termed a Territory (Similar to the Yukon and Northwest Territories, all three being part of our great country of Canada). It’s seemingly a small thing, but it does beg correction. For the record, Canada is made up of ten Provinces and three Territories.

Bill Verutis  
Ontario Power Generation

Dear Editor:

I love the intro “Never heard of the Province of Nunavut?” Well, join the club, neither have we. When I explain to my Canadian friends where I work, I often say I work for the Provincial Government since the word “Territorial” usually leads to a 15-minute geography lesson.

Tim MacLeod  
Sr. Technical Officer Arch/Bldg - Technical Services  
Department of Public Works & Services, Government of Nunavut

Thank you to both Bill and Tim for correcting our error regarding the political status of Nunavut. It is a remarkable place with great people, a thousands-year-old culture that defies all thermal logic and a great need for infrared thermography. We look forward to returning to the Territory of Nunavut soon to do more training.

–Editor

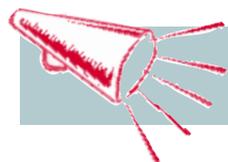


Apex Bay, near the territorial capital of Iqaluit, is one of the oldest settlements in the area. The fall tundra colors were spectacular.

We also received a note that radiometric temperatures, as shown in the two thermal images accompanying the article on emissivity, are most appropriately displayed in an SI scale, such as Celsius, rather than Fahrenheit as we showed. We appreciate the comment, which is well taken.

and law enforcement applications and the summary of a doctoral thesis on how IR is being used in the United Kingdom for fire fighting. The conference closed with a strong group still in attendance despite weather that had improved remarkably all week. All agreed it was a great return on their investment of time and money to learn more about the technology.

Next year’s conference is in the planning stages. Stay tuned for an update soon!



**Call for Papers • Call for Papers • Call for Papers**

# **Thermal Solutions<sup>®</sup>**

**January 26–29, 2004 Clearwater Beach, Florida**

## ***Call for Papers: Abstract due date June 20, 2003***

Snell Infrared is pleased to announce Thermal Solutions<sup>®</sup> 2004, a professional conference for infrared thermographers. This conference is open to *all* thermographers, regardless of equipment preference, previous training or company affiliation.

### **Condition Monitoring/Reliability**

We are looking for papers in the following areas:

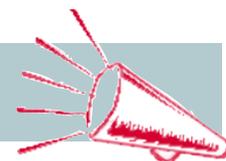
- ◆ **Condition monitoring**
- ◆ **Building diagnostics**
- ◆ **Applied R&D**
- ◆ **Spot radiometers**
- ◆ **Process monitoring using IR**
- ◆ **Program management**

***Interested presenters should write a brief abstract and submit it for review by June 20, 2003.***

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](mailto:info@thermal-solutions.org)> if you have any questions.
- ◆ Send abstracts to: Thermal Solutions<sup>®</sup>, P.O. Box 6, Montpelier, VT 05601-0006 or e-mail [abstracts@thermal-solutions.org](mailto:abstracts@thermal-solutions.org)

**Call for Papers • Call for Papers • Call for Papers**



## Still Independent, and Coming on Strong...

The Snell Infrared name continues to appear in many new places.

It is fundamental to our mission to be a resource to all thermographers. In that role, we provide up-to-date information to the entire infrared community. One very effective way of doing this is to work with the camera manufacturers and others in the condition monitoring industry. You may see our name associated with several different companies and with a variety of informational seminars. We have no formal relationship with these companies other than the commitment to bring the latest information to current and prospective customers.

Rest assured that we remain devoted to your needs when discussing infrared

equipment. Snell Infrared does not sell infrared cameras, nor do we receive any sort of commission from anyone. We are independent of the IR camera manufacturers and will give you free, unbiased information on the latest equipment on the market. Our organization works hard to develop and maintain good working relationships with ALL the manufacturers; it is important to us to remain knowledgeable about all available products.

When infrared is used effectively, it benefits the entire industry. Regardless of what product you use, we will help you use it to its fullest. We are by far the largest training company not tied to a manufacturer, and a resource to the entire IR community.

Please do not hesitate to pick up the phone and call us whenever we can assist you with understanding your equipment needs or to help you find products that can best meet those needs.

You can reach *Think Thermally*® at:

**Snell Infrared**  
**P.O. Box 6**  
**Montpelier, VT 05601-0006**

**Phone: 800-636-9820**  
**Fax: 802-223-0460**

**E-mail:**  
**<thinkthermally@snellinfrared.com>**

**Web Site:**  
**<http://www.snellinfrared.com>**

### Infrared tips for the week

**MONDAY** If you have tried to find a level in a tank covered with aluminum cladding, you know it is tough. The low-emissivity surface is reluctant to reveal the truth. Solve this by putting a vertical strip of paint or tape down the side (preferably on the shady side.) You'll find your level faster than you can say "reflectivity." You'll be confident that the information will be accurate every time and almost any time.

**TUESDAY** Keep track of your findings, even the ones you fix on the spot. Only by keeping statistics can you demonstrate your value. Stats will also help you learn to better manage your time and spend it where you will get the biggest returns. At a minimum, keep track of the total number of finds and pieces of equipment inspected. The more detail you can track, the more you will learn. You may discover the root cause of a persistent problem, or you may find that some inspections can be done less frequently. Your investment in acquiring this information will pay dividends over and over.

**WEDNESDAY** After using your camera out doors in cold weather, expect it to fog up when you come inside, especially if the inside air is at all moist. In severe situations, consider sealing the camera in a plastic bag before you bring it in. This will dramatically reduce the amount of condensation

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that can occur. Condensation can do some damage, especially to the inside of the camera and lens. If you plan to continue using the camera, leave it in the bag until it is warm. If you use a thermally transparent bag, you can even use the camera while it is in the bag.

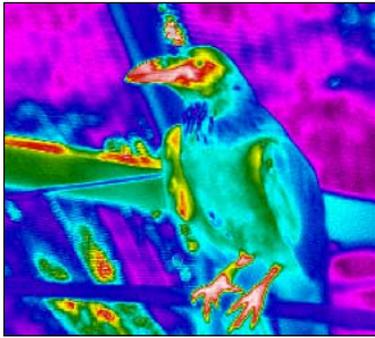
**THURSDAY** Find a thermographer at a sister plant (or even a plant outside of your business interests) and spend a day in each others' plants. Seeing first hand what someone else is doing can really stimulate the creative juices! Your boss may not understand when you first introduce the idea, but take time to explain the nature of your job and how it will benefit the company. Afterwards, write up a short report for your boss and show him or her the return.

**FRIDAY** Don't use infrared to do a job that can be better done with another tool; Use it where it offers a unique advantage. On small bearings, such as conveyors, vibration is simply not practical. Some steam traps or valves are too high up in the air for ultrasound to be effective. A \$30 bearing on a wood chip conveyor can easily cause a \$5000 fire. Even the best stocks don't pay the kind of return an inspection can.



## Winter World

*Winter World* is the latest book from biologist Bernd Heinrich, one of our favorite science writers. Like many of his other books, it should prove a favorite among thermal thinkers. It is devoted to the ways animals and plants have adapted to surviving in cold weather. The golden-crowned kinglet is the inspiration for this writing. Dr. Heinrich was puzzled how a little bird weighing about the same as two pennies could survive the winters of the northern forests in sub-zero weather.



*Ravens are one of the many animals that Dr. Heinrich has studied extensively. They exhibit an ability to self-regulate body temperature to prevent overheating. To do this they open blood special vessels and shunt blood, and thus excess heat, to the feet and head where it is convected away.*

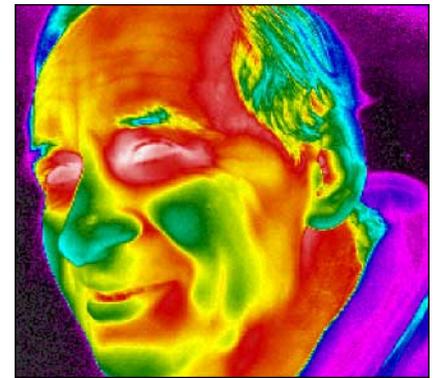
In addition to the kinglet, he also explores how other creatures cope, including rabbits, insects, turtles, voles and owls. Some turtles, for example, can live buried in lake bottom mud without

breathing for months on end. There are insects that can be dropped into liquid nitrogen and be later revived instantly—and with full functionality—in a glass of water. Heinrich's observations challenge the assumptions most of us have about the world we walk through every day.

The book is based soundly on the principles of heat transfer physics, but is an easy read. Thermographers will recognize many of the concepts he discusses, including the way nests are constructed to reduce conductive and convective losses, how some birds employ counterflow heat exchangers to regulate body temperature and the energy balance struck by honeybees seeking early blooms in trees.

In the end the author realizes that all he has learned and discovered about the kinglet is still insufficient to explain how it survives. "...I will continue to marvel at and wonder how the little feather-puffs are faring. They defy the odds and the laws of physics and prove that the fabulous is possible."

If you hunt, fish, walk in the woods, are curious about life around you or just want a good book to read, pick up a copy of *Winter World*. The world around you will never appear the same afterward.



*Dr. Heinrich exhibits a strong thermal pattern due to having just come in out of -20°F weather! The fact that he is an ultramarathon runner also contributes to the impressive pattern.*



## Snowflake Bentley

Many images come to mind when people think of Vermont, including fall colors, maple syrup and snow. We've had some great snow here this winter and it seemed appropriate to remind readers of one of Vermont's more interesting historic figures, "Snowflake" Bentley.

Wilson Bentley was born in Jericho, Vermont, in 1865. From an early age, he showed an affinity for exploring his winter world. His parents were poor dairy farmers, but they spent the unbelievable sum of money of \$100 on lens materials that Bentley fashioned into a crude camera mounted on a microscope to support his explorations. Why? He wanted to photograph snowflakes. He spent years perfecting this unique art in a way no one had even dreamed of previously.

By 1931 Bentley had published *Snowflakes*. This is a collection of half of the more than five thousand black and white photographic images he'd captured. He validated that no two snowflakes were identical and showed the world an amazing array of the six-sided ice crystals we all too often take for granted. The book is still in print and published by Dover Publications.

Bentley's driving curiosity is an inspiration and his persistence for capturing snowflake images is nothing short of an early technological miracle. The next time you have to shovel snow, drive in it, or button up to stay warm against it, think of "Snowflake" Bentley and the amazing work he did that helped us see these little gems. To view Wilson Bentley's photos and to learn more about his life, go to [www.snowflakebentley.com](http://www.snowflakebentley.com).

# Snell Infrared 2003 Course Schedule

## Level I (\$1,495)

|                  |                 |
|------------------|-----------------|
| Montpelier, VT   | March 3-7       |
| Tampa, FL        | March 10-14     |
| Indianapolis, IN | April 7-11      |
| Toronto, Canada  | April 28-May 2  |
| Palm Springs, CA | May 5-9         |
| New Orleans, LA  | May 12-16       |
| Minneapolis, MN  | June 9-13       |
| Montpelier, VT   | July 21-25      |
| Lebanon, OH      | August 11-15    |
| Seattle, WA      | September 8-12  |
| St. Louis, MO    | September 22-26 |
| Pittsburgh, PA   | October 6-10    |
| Charlotte, NC    | October 20-24   |
| Toronto, Canada  | October 20-24   |
| San Antonio, TX  | November 3-7    |
| Montpelier, VT   | December 1-5    |

## Level II (\$1,495)

|                  |                 |
|------------------|-----------------|
| Montpelier, VT   | March 24-28     |
| Charlotte, NC    | May 5-9         |
| Montpelier, VT   | June 23-27      |
| Indianapolis, IN | September 15-19 |
| Toronto, Canada  | October 27-31   |
| San Antonio, TX  | November 3-7    |

## Level III, Best Practices (\$995)

|                |                 |
|----------------|-----------------|
| Montpelier, VT | September 23-25 |
|----------------|-----------------|

*(Courses in Research & Development, Process Monitoring, NDT/NDE of Materials & Prep Course for ASNT Level III T/IR Exam are available. Call for details!)*

**Reserve your spot today!**  
**800-636-9820**

## Specialty Courses (\$750)\*

### Mechanical Applications:

|                 |                 |
|-----------------|-----------------|
| Toronto, Canada | March 18-19     |
| San Diego, CA   | September 23-24 |
| Detroit, MI     | October 7-8     |

### Electrical Applications:

|                 |                 |
|-----------------|-----------------|
| Charlotte, NC   | April 15-16     |
| Toronto, Canada | May 13-14       |
| Detroit, MI     | September 23-24 |
| Phoenix, AZ     | October 7-8     |

### Building Applications:

|                  |                |
|------------------|----------------|
| Indianapolis, IN | March 18-19    |
| Toronto, Canada  | November 12-13 |

### Analyzing Products & Processes:

|                 |           |
|-----------------|-----------|
| Toronto, Canada | May 21-22 |
|-----------------|-----------|

\* Level I or extensive thermographic experience is a recommended pre-requisite for these two-day Specialty courses.



Training, Certification and Support for Thermographers

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05601-0006

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FAX 802.223.0460

**All courses can be presented  
on-site at your facility...  
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