

FACE LIFT AT ST.PETERS CATHEDRAL

By Lisa West, ITC International Manager

Michelangelo's last work, St. Peters Cathedral in the Vatican City, is getting a face-lift with the help of thermography. FLIR customer Eni, headquartered in Rome, Italy, is the sole scientific partner of Fabbrica di San Pietro in the restoration of the Façade of the Basilica of Saint Peter. Thermography is being utilized to control physical characteristics and to ascertain the state of preservation of the elements of the Façade of St. Peter's Basilica, widely recognized as the largest and most magnificent church in all of Christianity.



Peter's had progressed to an alarming extent. Over the next two centuries, a new Basilica was constructed, of which Michelangelo received control in 1548.

The restoration and conservation of artistic monuments has been an intensive two-year focus for Giuseppe Calloni and Giuseppe Giunta of EniTechnologie. In February of 1998, Mr. Calloni attended a thermography course taught by Bernie Lyon of the Infrared Training Center in Billerica, Massachusetts. After discovering the potential of infrared, Eni purchased a camera. Mr. Calloni recently told the itc, "Our thermographic work has been considered very innovative and of high quality...the result of our work has been presented to the management of the Louvre Museum in Paris and has caught the interest of the international press."

Their thermographic techniques proved to be very effective to diagnose the state of the monument before the restoration, and to verify the quality of the actual restoration effort. The team from EniTechnologie was able to identify cracks, detachments of stucco from the stone surface and deposits of humidity that would otherwise remain hidden. The most significant use of thermography was in evaluation of the stuccos where differentials of 0.5°C were determined to be the critical threshold. Thermography allowed the team to control and guarantee the state of approximately 50,000 stuccos on the Façade of the Basilica.



The Basilica of Saint Peter is the centerpiece of Christianity and the Vatican City. A simple sanctuary was constructed in the year 323, built in the form of a cross to commemorate the crucifixion of Apostle Peter. Great emperors, and even today most popes, are buried in the tomb of St. Peter. By the fifteenth century the decay of Saint

Inside this issue:

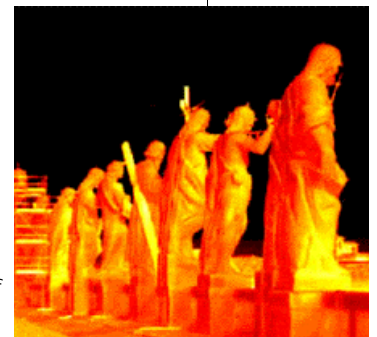
Focus on Apps: Supermarkets in a Deep Freeze?	2
Meet the Staff	2
About the itc	4
Contact Information	4
Upcoming Classes	4

Continuing Education for Thermographers



September 24-27
Orlando

www.inframation.org



(Continued on page 3)

FOCUS ON APPLICATIONS - SUPERMARKETS IN A DEEP FREEZE?

By Stephen Moore, Intrinsic Energies Indications, LLC

At the conclusion of 1993, a Ford general foreman asked me to join the Preventive Maintenance department to perform electrical predictive maintenance. I am an industrial electrician and had prior infrared experience. When I started in January, the PM foreman gave me free rein to establish a proactive maintenance protocol. By mid 1996 our plant was evaluated and awarded the PM Excellence Award. A senior corporate engineer told me to keep up the excellent work and that the electrical PdM program in this plant was one of the finest he had seen in the Ford Motor Company.



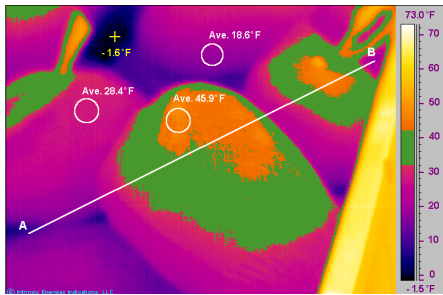
Last winter I thought, "Why not take the 570 into a grocery store and examine the refrigerated food?" I found a willing grocer and took a look around. A whole new world opened up in the way thermal anomalies popped out in front of me. Distinct warm spots in refrigerated cases displaying raw meats, cheeses, processed meats manifested themselves. That night I saved more than twenty images,

"thermography can easily rescue grocers from spoiled stock that needs to be replaced and hefty lawsuits"

and some showed serious problems. One of these was thawed turkey in an overstuffed, open-top freezer. A meat handler wanted to give an impression of "Plenty" by having a large supply of turkeys on hand in that freezer. You can see the insidious result in one of the images shown here. Imagine someone grabbing that thawed turkey, placing it in a hot car for a while before finally taking it home. There they might place it into a freezer for at least a month or more before using it.

Infrared thermography can easily rescue grocers from spoiled stock that needs to be replaced and hefty lawsuits. The food business benefits from increased efficiencies and the public benefits from a safer food supply. Contact thermometers used to measure the temperature of raw meat run the risk of transferring bacteria to ready-to-eat foods. Infrared imaging yields a picture of entire refrigerated food cases without contact. Contrast this with a random-point-sampling of the same objects with a temperature probe or even a single detector radiometer. The unique "non-contact" nature of this method makes infrared thermography a natural partner in food protection. ♦

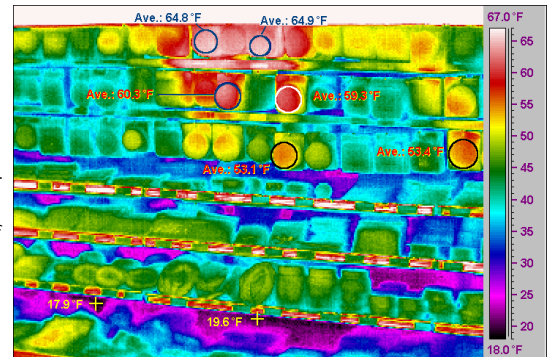
Stephen receives an "IR Thinking" T shirt for his contribution. It is not easy generating clients in the food industry. Perhaps someone from our readership can offer Stephen advice on developing this market. Contact him at Intrinsic Energies Indications, LLC, P.O. Box 346, Saline, MI 48176-0346, Tel: (734) 944-8169, e-mail: intrinsicenergies@excite.com - Editor



Thawed turkey in the "frozen" food case

By the end of 1997 frustrations at Ford and my love of infrared technology led me to form Intrinsic Energies Indications, LLC. In May 1998 I purchased an AGEMA 570 and began looking for new applications for the infrared camera.

Recently, the FDA has formulated new standards for refrigerated foods in the pipeline between farm and field and the consumer. The old threshold of 45° F has been lowered to 41° F. States are now in the process of implementing this standard.



Warm packaged meats in the "refrigerated" case

MEET THE STAFF - BERNIE LYON

Bernie is well known to students who have been to the itc, having been the "anchor trainer" for a number of years.



Bernie is the itc Training Course

Moderator and holds an ASNT (American Society for Nondestructive Testing) NDT Level III TIR Certification. Bernie also has a B. Sc. degree in secondary education, Earth Science major.

With fifteen years experience in the infrared industry, Bernie has been teaching IR Thermography since 1986, both in-house and at customer sites. Additionally, he

has over five years experience in servicing, calibrating, customizing, and operating infrared imaging systems.

Bernie's keen interest in science fiction as well as his electronics genius led him to develop the world famous Therma Boy shown on the next page! ♦

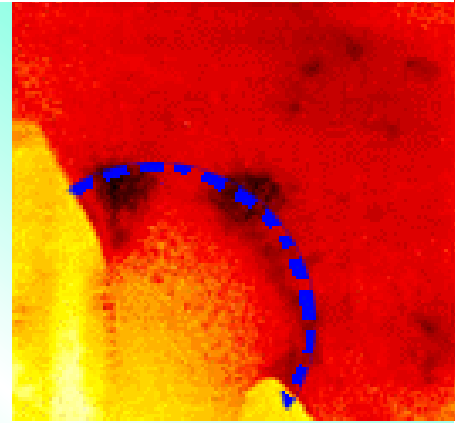
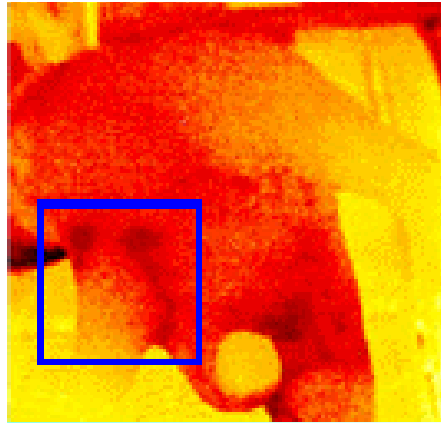
THERMOGRAPHY HELPS ST.PETERS CATHEDRAL (CONT'D)

(Continued from page 1)

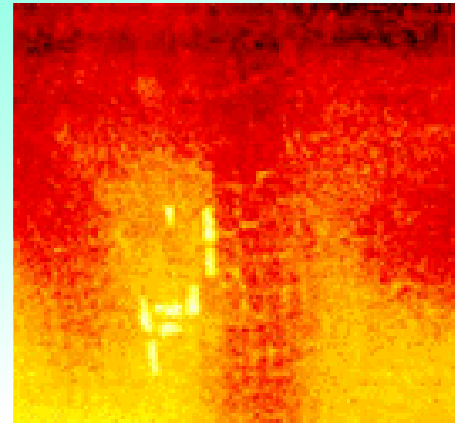
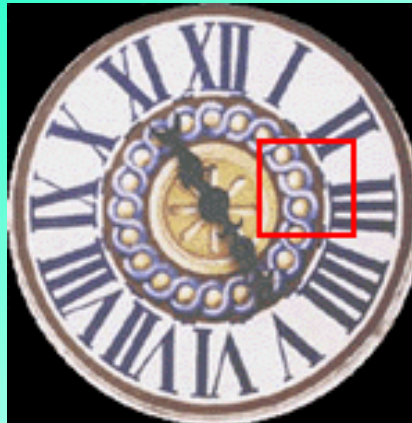
The project has been categorized as a success. His Eminence Cardinal Virgillio Noe, president of the Fabbrica di San Pietro, is pleased and expressed gratitude to the team. "Due to the harmonic and proficient cooperation among the technicians and personnel of the Fabbrica di San Pietro with those of the Eni group, the Façade is about to be unveiled." The project team at Eni have met their commitments within a very challenging timeframe and concluded that "thermography proved to be a virtually irreplaceable instrument in the various phases of the project," and that their discoveries will prove "invaluable for future works of restoration on historic monuments."

You can find detailed information about the restoration at www.enitecnologie.it/en/spietro/sp_home.htm. ♦

Eni is an integrated energy company, operating in the oil, natural gas, and petrochemicals industries. Contact Mr. Giuseppe Calloni at: gcal-loni@enitecnologie.eni.it or their website at <http://www.enitecnologie.it/ethome.htm> — Editor



These thermal images are of the left hand of one of the statues. The temperature within the map varies from 11.7° to 16 °C . The coldest zones (the darkest areas of the map) correspond to the lesions that were repaired with stucco during the 1985-86 restoration (see the detail of the base of the pinky finger). The thermal image shows that the stucco is in a state of detachment from the surface of the stone, with the consequent creation of a humidity deposit in the area where the stucco meets the stone substrate. The other cold areas (from the palm to the wrist) are also rich in humidity. In this case, however, the cause is not restoration but rather the presence of colonies of micro-organisms.



Thermography was also used to evaluate the state of preservation of the individual components of the mosaics in the two clocks located on the two extremes of the facade. The thermogram presented in above shows a portion of the "Oltromontano" clock mosaic (a surface of about 30 x 30 cm²). The temperature varies from 14.0° to 16.5° C. At the center of the thermal image, there are several sections that are markedly warmer, revealing a condition of thermal isolation from the substrate of the mosaic. Systematic analysis makes it possible to reconstruct a detailed map of the individual mosaic stones that are affected by this type of problem. The data gathered by the thermographic survey were supplemented with those gained from the high frequency (1.5 GHz) GPR surveys carried out on the same areas. These latter surveys provide structural details relative to depths of up to 50 cm.



Therma Boy thermography system



Itc U.S.A., BOSTON

16 Esquire Road
N. Billerica, MA 01862, USA

Tel: +1.978.901-8405
Fax: +1.978.901-8832

E-mail:
info_us@infraredtraining.com

Itc INTERNATIONAL, SWEDEN

Rinkebyvägen 19
SE-182 11 Danderyd, Sweden

Tel: +46 (0) 8 753 25 00
Fax: +46 (0) 8 753 26 01

E-mail:
info_international@infraredtraining.com

About the Infrared Training Center

The Infrared Training Center offers training and certification in all aspects of infrared thermography use. Our world-class training facilities are located near Boston, Massachusetts, USA and Stockholm, Sweden and have the world's most extensive hands on laboratories for infrared applications. Please join us in exploring the fascinating world of infrared!

Your comments and suggestions about this newsletter are welcomed and encouraged. If you have an interesting application or case study to share, we encourage you to submit it for publication.

Please e-mail to Gary.Orlove@flir.com or snail mail to the USA office

*"Hands On" Thermography Training,
Certification, and Support*

We're on the Web!
[www.
infraredtraining.com](http://www.infraredtraining.com)

itc **INFRAMATION** Editor: Gary Orlove

Design: Gary Orlove

Upcoming Classes USA

Remember that we also teach customer site training courses at your convenience. Please contact us for more information.

550, 570, PM545, PM575, PM595,
SC2000 cameras ONLY

All IR cameras

Level I PdM

- April 10-14
- **May 1-5**
- May 8-12
- **June 5-9**
- June 12-16
- **July 17-21**
- July 31-August 4

Level II PdM

- April 3-7
- **August 14-18**

Level III PdM

- April 17-20

Management Certification

- May 22-23
- July 27-28

Software Training

- May 24-25
- **June 20-21**
- July 25-26

Regional Courses

- May 2-4 (Gillette, WY)
- May 23-25 (Portland, OR)
- June 5-8 (Dallas, TX)
- June 5-8 (Toronto, ON)
- June 6-9 (Dallas, TX)

Upcoming Classes Sweden

Level I CM

- April 10-14 (W15)
- May 8-12 (W19)
- May 15-19 (W20), Spanish
- June 5-9, Russian (W23)
- June 12-16 (W24)
- July 10-14 (W28)

Level II CM

- May 29-June 2 (W22)
- September 4-8 (W36)

Level II R&D

- April 17-20, French (W16)
- May 22-25 (W21)

Advanced Operator Training

- April 6-7 (W14)
- May 4-5 (W18)
- July 6-7 (W27)

Management Certification

- April 3-4 (W14)
- September 18-19 (W37)

Upcoming Classes Germany

Level I

- April 10-14 (W15)
- May 22-26 (W21)
- June 5-9 (W23)
- July 24-28 (W30)

Application Seminars

- April 5-7 (W14)
- May 3-5 (W18)

Level II

- June 15-17 (W24)
- June 29-July 1 (W26)