



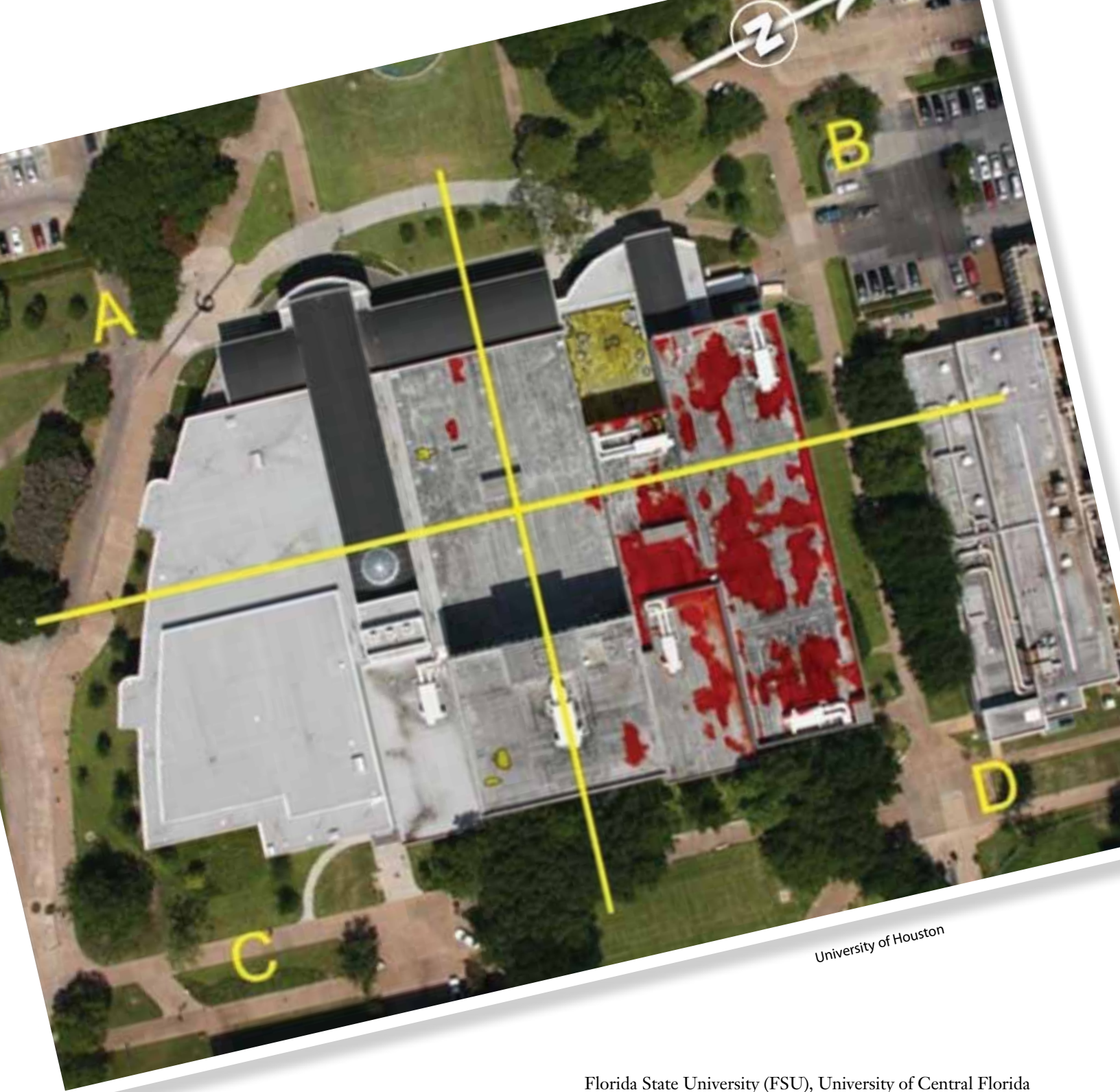
BY VALERIE B. PATTERSON

The New Generation of

THERMAL MAPPING

Thermal imaging was used 60+ years ago to enable the targeting of heat-seeking missiles and seeing opposing forces at night. Today thermography is employed for myriad uses, from turning on faucets, to tracking and attacking enemies from aerial spy drones, to identifying the scope of moisture infiltration in building envelopes.

Thermography for facilities management has gone through an evolution of camera technology and procedures starting six decades ago with hand-held cameras and men walking on roofs in the dark. The new technology involves aerial data collection and patented computer analysis that identifies wet materials invisible to the naked eye. The goal in all cases is to accurately see inside roofs and walls to enable the visualization of what is invisible.



University of Houston

Infrared Concepts Corporation (ICC) is a building diagnostics company using thermal imaging that includes destructive core testing and independent lab verification in their service to confirm the accuracy of their non-destructive reports. ICC married this once classified military technology with proprietary medical MRI software and analysis, to achieve a patented process that clients have proven accurately identifies building envelope moisture infiltration. The results have been validated as being many times more accurate than other traditional thermography methods.

Florida State University (FSU), University of Central Florida (UCF), University of Houston (UH), and universities administered by the State of Mississippi are among campuses that have secured the patented reports and proven the accuracy of the diagnostic intelligence by validating the results through coring and lab testing.

MRI-like software analysis sees hundreds of times more data than can be seen by the human eye, and is combined with helicopter-based “stare” technology from a hover position as data collection platform and a camera with an InSb-cooled sensor. We have experimented with using an airplane, but the helicopter-collected data is far superior.

Strozier Library, Florida State University



Mississippi Valley University



Confirming accuracy of all non-destructive testing is paramount. Roofing is a \$19 billion industry, and everyone who profits wants to encourage total roof replacement. However, restoration is often the wiser investment. By looking inside the roof with thermography and getting confirmation of the results, real science becomes a guide to the best course of action.

Florida State University (FSU) has been using thermal mapping for 12 consecutive years to inspect every low-sloped roof on the campus. FSU's Tom Shewan, P.E., asserts the technology assists them in finding leaks the first time, deciding whether to repair or replace a roof and holding installing contractors accountable. "We have used [this technology] to manage roofs in place that are more than 40 years old, and we forced a contractor to completely tear off and replace a new roof," says Shewan. "We believe that our investment serves us better and is less expensive than adding staff. Our zone managers convey that the reports help them identify leaking problems quickly so they can be resolved."

Dave Irvin, vice chancellor at the University of Houston, states that the value and the unique accuracy of [thermal mapping] became real to them after Hurricane Ike. According to Irvin, UH tried physical inspection, a hand-held walk over infrared survey, and an outside architectural/engineering firm to assess damage. Using all these techniques resulted in only four or five problem roofs and \$4 million in damage.



University of Houston

BY LOOKING INSIDE THE ROOF WITH THERMOGRAPHY..., REAL SCIENCE BECOMES A GUIDE TO THE BEST COURSE OF ACTION.

"After using thermal mapping, we were able to justify over 30 problem roofs and receive a final award of over \$26.3 million," says Irvin. "Several years following Hurricane Ike, UH is finding that leak reports on many buildings have been reduced by 98


percent. Because UH now has water-tight structures, buildings are experiencing a 10 degree temperature shift, so we know we're enjoying significant energy savings."

Irvin says UH updated ICC's Hurricane Ike report with another inspection following the roof replacements and repairs and were able to resolve defects created by the contractor when making the replacements. "Had these defects gone undetected combined with having not received the additional \$22 million in restoration funds received from FEMA and insurance," says Irvin, "the university would have been heavily burdened with the cost of water infiltration related mistakes."

Irvin has since become vice president of facilities at the University of Tennessee in Knoxville and plans to utilize the technology there as well.

The State of Mississippi is implementing recommendations presented in APPA's Facilities Management Evaluation Program (FMEP) report, which includes accountability and injecting new game-changing technology to improve decision making. The State of Mississippi's Glenn Kornbrek, director of the Bureau of Buildings, tested ICC's service on 400 buildings throughout six university campuses. "ICC identified 10 to 20 roofs that are proposed for replacement that may be salvageable. We've conducted coring and gravimetric analysis on one campus so far and found ICC's accuracy to be 100 percent on all areas identifying probable moisture. Should the remainder of the coring effort prove the same, the potential exists for saving or reallocating millions of dollars," says Kornbrek. "We see one of their greatest benefits is identifying moisture problems while they are still small, instead of allowing them to escalate into a total roof replacement."

The University of Central Florida (UCF) has also enjoyed the benefits of their patented reports, multi-level AutoCAD and Web-based reports. "We recently cored and gravimetrically tested roofs verifying ICC's results," says Frank Ballentine, assistant director of physical plant operations. "In some cases the cores were four to six times

the threshold identified by the Florida Building Code justifying insulation replacement. The reports were 100 percent accurate in terms of the cores identified as dry." 

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