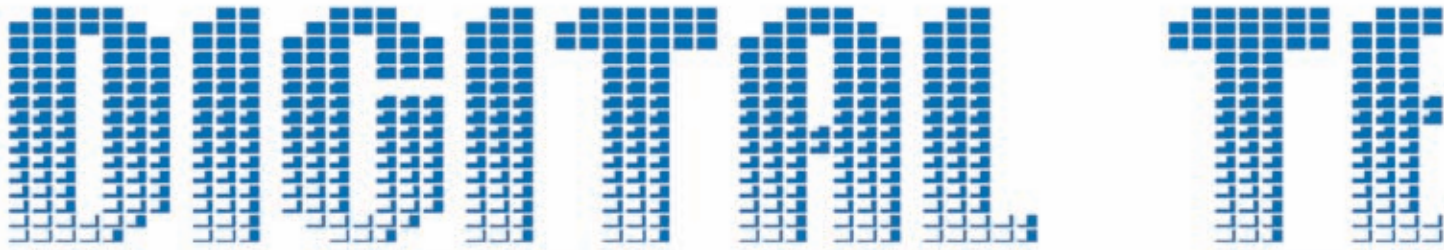


# TAKING



## A Case Study: Langley Air Force Base Uses Digital Technology on the Roof

**H**istorically, when software companies have tried to automate roof information management for roofing professionals and building owners, the efforts have actually created more work, not less. Most people would attest to the value of having up-to-date, quality information to help manage roofing projects and roof assets. The question becomes: How can this be done efficiently?

The challenge lies in the way informa-

tion is collected, stored, and managed. Information databases need to be created and then regularly updated to remain current and useful. The caretaking of this data is time consuming and has to be done on top of day-to-day work. The best intentions and most ambitious data management projects inevitably result in neglected data and outdated records, which require a great deal of time and money to update. Unfortunately, this process of the database driving the business owner is destined to repeat itself.

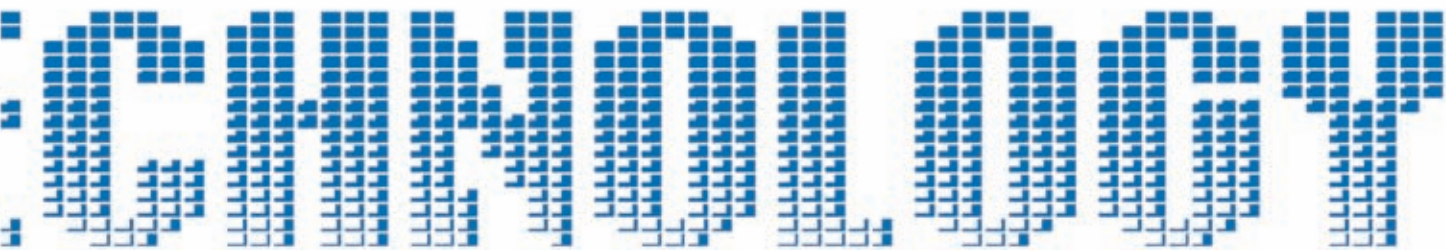
Last year, the U.S. Air Force's Air Combat Command (ACC) began efforts to overcome this resource drain at Langley Base in Hampton, Virginia. Like many public agencies, the Air Force hires consultants to do roof inspections that produce data used for long-term financial and project planning. These assessments have traditionally produced many boxes of papers and photos, which are then loaded into a database that produces roof condition scores used to help ACC allocate funds for roof maintenance, repair, and replacement. The challenge is that the information in the database becomes obsolete very quickly.

As a result, ACC started looking for a better way to collect and manage this information. Last November, ACC contracted with a consulting engineering firm teamed with a software service company that offers a roof information model that will keep ACC's database current without ongoing, additional effort.

This new information model uses patented technology that combines a portable Global Positioning Satellite (GPS) unit and a hand-held computer, thus allowing for digital data collection on the roof. Inspectors can measure, inventory, photograph, and record all components and defects while on the roof. The system creates a seamless transfer of information collected on the roof to an Internet database with condition assessment reporting and project development capabilities. Every rooftop inspection or service call creates a digital documentation of the conditions and any work completed. The information is then automatically uploaded to a PC, and the database is updated within minutes.



*Photo 1 – Hardware used on the roof.*



# TO THE ROOF

By Kent P. James, LEED AP

This process eliminates the busy work and paper files typically required to collect, process, store, and use roof information. More importantly, because it grabs the data as part of the normal tasks involved in performing roof inspections and maintenance, it requires no additional work to keep the database current. The result is a dynamic building record that is always current and relevant for the contractor or building owner.

A good example of the power of dynamic information may be drawn from the car rental business. When someone returns a car, the rental company attendant uses a hand-held, digital computer that manages the information from the transaction and produces a receipt. At the same time, the technology is keeping track of the car's mileage, which feeds into a database for servicing the fleet of cars, etc. Using technology at the point of transaction enables the rental car company to easily update and manage the data that impact many aspects of its business.

It's the same thing with this roof information model. By placing the tech-

nology at the heart of each transaction, the roof information can become a powerful force for managing a business. Over the next few years, this new information model will become an integral part of the roofing, waterproofing, and building envelope industries, allowing for the seamless transfer of information between different business functions (e.g., estimating, project performance, maintenance, and service).

The Langley Air Force Base project initially involves collecting data on 667 roof sections on 325 buildings, amounting to about 3.55 million square feet. The infor-

mation collected will then be integrated into Langley's existing database and can be used to generate interactive roof maps and reports to support project planning and roof maintenance and repair. This phase of the project will be completed by late spring 2007. "We look forward to assisting ACC with its infrastructure assessment process by providing a dynamic analysis tool that will directly link with its GeoBase platform and Air Force Portal," says J. Douglas Coenen, III, PE, from PBS&J in Newport News, the consulting engineering firm leading this project.

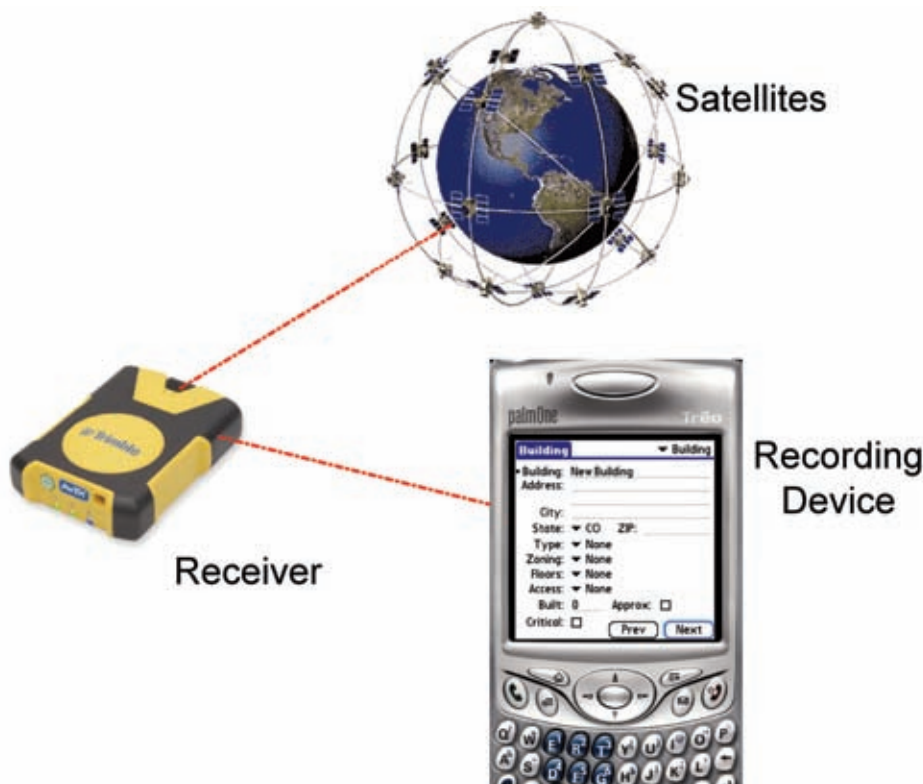


Photo 2 – Using Global Positioning Satellites (GPS) to record spatial information on the roof.

## New Tools and Improved Processes Bring New Value to the Roofing Industry

Projects like the one at the Langley Air Force Base will become more common as others see the value of using new tools to collect, manage, and present roof information. For many years, roofing professionals have relied on the same tools to collect the information used in estimating, proposal writing, spec generation, and assessment: a tape or wheel to measure the roof along with a pad of paper, a pencil, a camera,

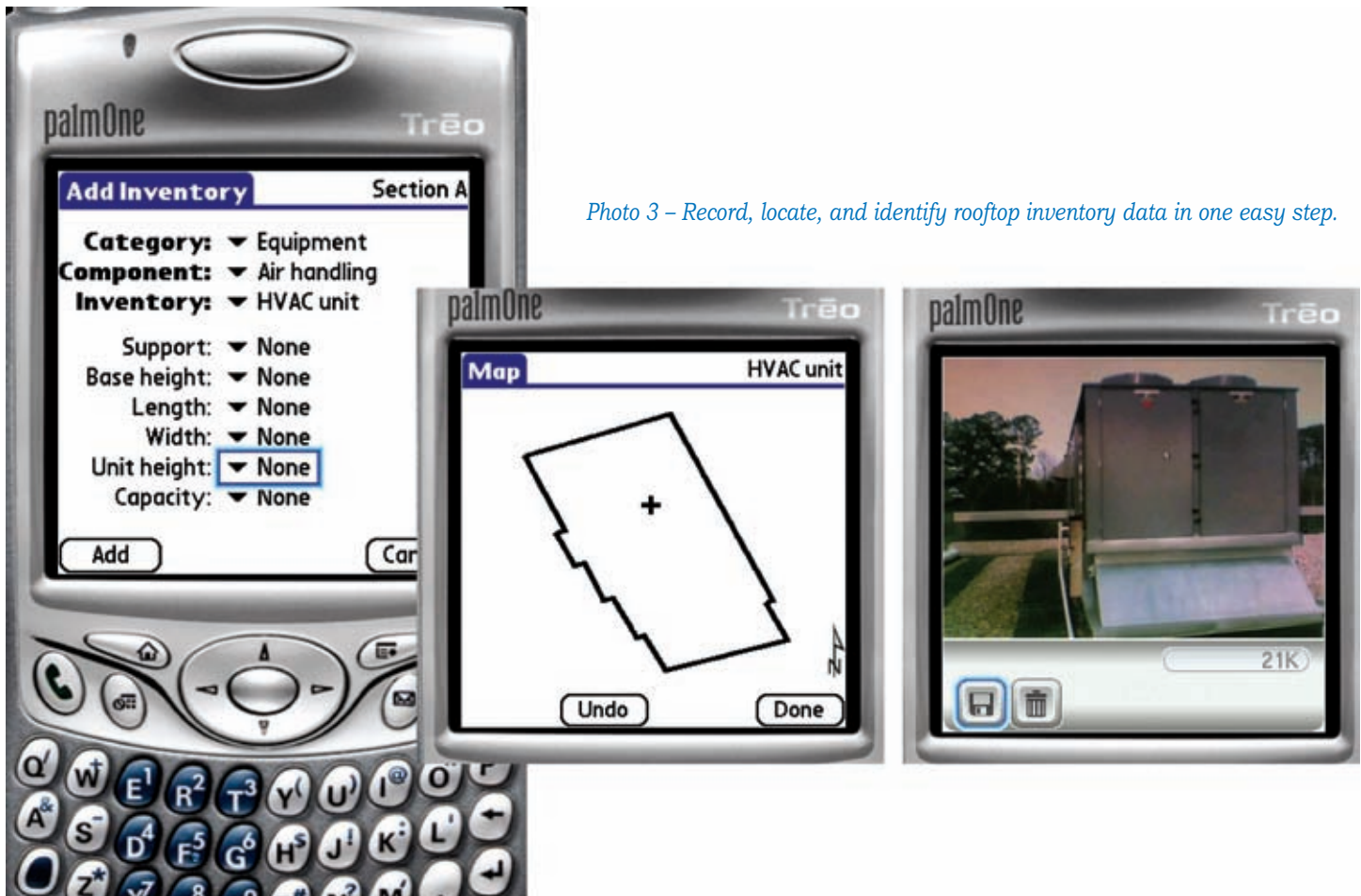


Photo 3 – Record, locate, and identify rooftop inventory data in one easy step.

and a tape recorder to document their findings. All of this information is brought back to the office to be compiled into reports, drawings, proposals, specifications, and a variety of other deliverables required to serve the building owner community.

This process has worked well and served the industry for a very long time, but it also has many drawbacks. Data can be incomplete, information may get lost or misinterpreted between the roof and the office, and consistent standards are often difficult to set and repeat. Additionally, this process is extremely time-consuming for the person trying to compile and organize the information for presentation and project planning – a resource drain that impacts productivity and eats away at the bottom line.

The good news is that many of today's cutting-edge technologies are beginning to emerge in the roofing industry. These new assessment tools feature sufficient computing power, imaging technology, and memory to eliminate the need for pencils, paper, and external cameras. Taking such digital technology to the roof allows professionals to build maps and condition assessment proposals while they are on the roof and then

utilize the power and convenience of the World Wide Web (i.e., the Internet) to store, edit, manage, and present that information to their clients.

#### Using Digital Technology to Build an Information Model on the Roof

Using a combination of a GPS receiver and a hand-held computer essentially allows professionals to build reports while they are on the roof. The GPS receiver is used to capture latitude and longitude data that form the basis of roof drawings, quantity development, and deficiency location and identification. The hand-held computer allows for easy access to inventory descriptions, deficiency descriptions, and roof images. Software integrates inventory, measurements, conditions, and corresponding photos, thus eliminating the need to compile and interpret information later in the office. The information related to inventory and deficiency data can be defined based on company requirements, client requirements, or default industry standards. Any of these sources of data ensures that each user is completing rooftop data collection that is both consistent and objective.

Once data have been collected and

transferred to the Internet, Web services can produce drawings, measurements, roof maps, proposals, and quantity spreadsheets. All of this is fast, easy to produce, and secure for future retrieval. In addition, all of the information is now in a data model allowing for:

- Repeatable measurements using GPS data;
- Automation of roof condition proposals, quantity take-offs, and client executive summaries;
- Sharing of information online with clients.;
- Automatic production of a roof map from collected measurements, inventory, and defect information;
- Positioning of inventory and deficiency information on the roof using GPS; and
- Displaying of photos, dimensions, and descriptive information to fully understand the situation on the roof.

The advantages of this system include huge time savings back in the office as well as the ability to drive a consistent and objective process. It allows the roofing pro-

professional to focus on analyzing the information and making decisions and recommendations to support his or her customers, while allowing experienced (and often lower-paid) personnel to act as his or her eyes and ears by collecting data on the roof. On those occasions when roofing professionals need to get on roofs and inspect with their own eyes, this technology can make their time on the roof more productive.

### A New Paradigm in Roofing Information Technology

In the past, when software companies have introduced programs for the roofing industry, the basic function of all these developments has involved the automation of manual tasks while retaining the same or similar output. Simply stated, this means the tools were developed to facilitate the delivery of the same work product. Estimating software delivered estimates. Scheduling and project management software helped manage information and work flow. CAD programs produced and communicated spatial roof information. Word processing created a report. Accounting software supported invoicing. Money management databases stored information. And spreadsheets managed data and made calculations. While all of these tools and software created some efficiencies and boosted productivity, the work product itself (i.e., estimates, schedules, reports, diagrams, invoices, and data files) has changed very little.

Now that the roofing industry is adopting information tools and software applications, the focus is beginning to shift from outputs (i.e., reports, estimates, etc.) to the information itself. For roofing professionals, this trend has several implications that can affect their ability to run a competitive business. Automation allows multiple tasks to be completed simultaneously (i.e., building a map while performing an inspection). The development of dynamic building information models replaces the need for paper-based plans and specification documents. Storage of information via a centralized Web site database service facilitates project collaboration and communication with field staff and customers. The technology is no longer just automating existing processes, but actually improving the processes in ways that bring added value to the building owner.

Further integration of information will allow the contractor, owner, suppliers, and other stakeholders to access and interact

with the same information. This model will also facilitate a seamless transfer of information between different functions (e.g., estimating, project performance, maintenance, repair service, etc.). It also supports intensive "data harvesting," allowing roofing professionals to objectively analyze project and material performance across large geographies and/or personnel. Results of this analysis will serve to support decision making that is data-driven and verifiable and will help roofing professionals better support their clients, whether they have very large and diverse holdings or only

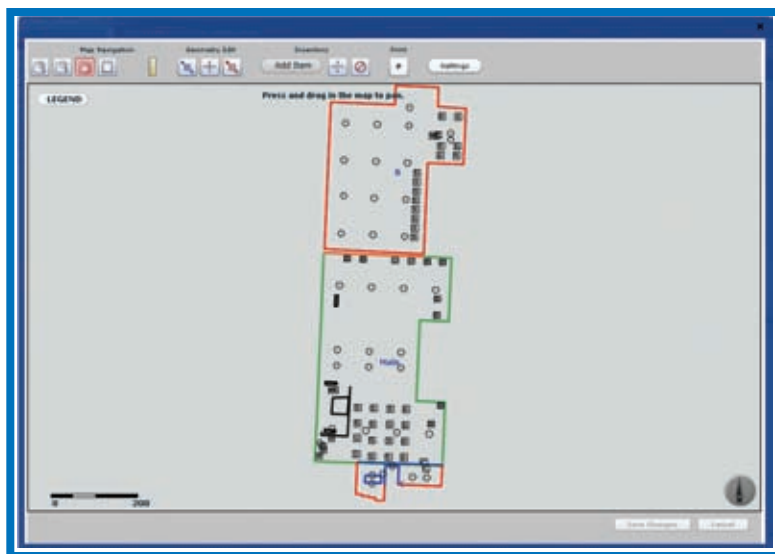


Photo 4 – Web-based interactive roof map generated using GPS data collected using a hand-held device.

a single structure.

Why does all of this matter? Information is a valuable – and powerful – competitive advantage; the owner of the information can own the life cycle of the roof. Better information leads to improved customer service (e.g., real-time information sharing with the customer and a history of the building that



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allows for long-term planning). Good information allows a company to retain knowledge, even through employee turnover, again helping to better serve the client.

### Conclusion


While the use of tapes, wheels, pencils, and paper has sustained the roofing industry for many years, the time has come for roofing professionals to embrace and utilize new technologies and ways of doing business. Much of the work product consultants deliver to their customers (i.e., reports, proposals, spec documents, and estimates) may remain the same, but technology decreases the time and cost associated with producing these items.

Additionally, technology allows a consultant to utilize the new information model in order to deliver beyond the expectation of the typical client. Web services allow the consultant to take his or her clients on “virtual tours” that help drive home and educate them on the condition of their roof assets. Data harvesting can help clients understand the future performance of the roof systems and aid in adequately budgeting to ensure the roofs keep their buildings’ occupants dry for a long time to come. Data storage and consistent data collection help to ensure that future generations can still serve clients and manage information when the owner or key employee retires. All of this

adds up to better business, which is good for the consultant, his or her customers, and the roofing industry in general.

What are the critical factors to consider when adopting such technology? There are several keys necessary for a successful implementation of this information model to a business. First and foremost, a person must have a clear understanding of the business goal of the information being used. (Should it grow the business? Better serve existing clients? Deliver new products or services?) Next, he or she must define metrics that allow the firm to evaluate the benefits of information to business, calculate and measure hard and soft costs, and compare alternatives. He or she needs to make sure that all of the employees are onboard by clearly communicating the goals

and expected benefits of technology implementation. Training and technical support are needed to help employees adopt the technology and get the most out of it. Finally, it is critical that upper management endorse the process through visible participation and support.

Making roof information work for a business can be a potentially time-consuming and costly endeavor and will require the commitment of all the people in the business, but the benefits make the effort worthwhile. Good, quality roof information helps manage a business and serves to provide customers with the best that technology has to offer. This is good for both the consultant and the client. 

### Kent P. James, LEED AP

Kent James is vice president in charge of strategic accounts for Roof Express, LLC. His function at Roof Express is to work with roofing product manufacturers and other large-scale customers to define project requirements and to customize Roof Express to meet the specific needs of these customers. Kent is also in charge of project definition and delivery to large owner clients such as the Air Force and other government agencies. He has acted as the project manager and lead sponsorship salesman for the RCI-Mercury Web site over the past few years.

