Accident Reconstruction – Full speed ahead

Ed Oliveras | SPAR Point Group | 1/7/2013



Original scanned vehicle image. Atlantic Laser Scanning Services; FARO Scene 5.0. Published January 7, 2013.

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In Eddie’s words

> “Of course, laser scanners are data collection tools.”

> “If you’ve already got scanning expertise and are looking to break into a new market, you can set yourself up to provide just laser-scanning services and team with Recons in your area, or if you’re serious about providing accident reconstruction services, then consider specialized training before diving in.”

What the dated article records

Eddie describes people coming to him for scanning and business advice, explains why the operator needs expertise, and illustrates vehicle preservation with his own damaged car, Cortes Towing and Atlantic Laser Scanning. The original also credits Dustin Productions. It records his role and advice in January 2013; it does not establish sole invention or resolve later business disputes.

Historical context

The following is the complete recovered article text, with original image credits and clickable source links. Product, legal and technical statements describe the time of publication. They are not current professional advice. Broken external services and retired software are not silently replaced.

These excerpts do not establish sole invention, current affiliations or every detail of a later recollection. The full original follows so readers can judge the context.

Complete recovered article

Lately I've been getting many people brand new to scanning, including land surveyors interested in expanding into new markets, visiting me for consultation on how to start a business in Accident Reconstruction – often with no prior experience, training or even scanning knowledge! Apparently, almost anyone can offer accident reconstruction services (depending on the state); it's not a professionally regulated industry here in Florida, much to my surprise. Obviously, though, those that have better "credentials" get more business, along with those who have what I call "feathers in their caps" like retired police officers or those with an engineering degree, even a Ph.D. in a specific discipline.

So how on Earth do these people think a noob break into such a competitive field? Because 3D laser scanning has seen impressive sales growth in that industry within the last couple of years, largely in part to the affordability of new scanners. "Recons," as they sometimes call themselves, are always trying to keep an edge over their competition, and now just having a scanner in the room at a meeting can impress their attorney clients (yea, the guys on daytime TV commercials between your soaps). In fact, it's getting to be the expectation that this technology is required, sometimes replacing more traditional tools like total stations or (gulp) the measuring wheel.

So, people are trying to break into the field using a laser scanner as their cap feather.

Of course, laser scanners are data collection tools. And it's not the tool but the operator who is expected to have the know-how and expertise to apply the technology to the application and produce something worthy of helping their client at trial. If you've already got scanning expertise and are looking to break into a new market, you can set yourself up to provide just laser-scanning services and team with Recons in your area, or if you're serious about providing accident reconstruction services, then consider specialized training before diving in.

Here are just few ways Recons are using scanning, specifically for vehicular accidents:

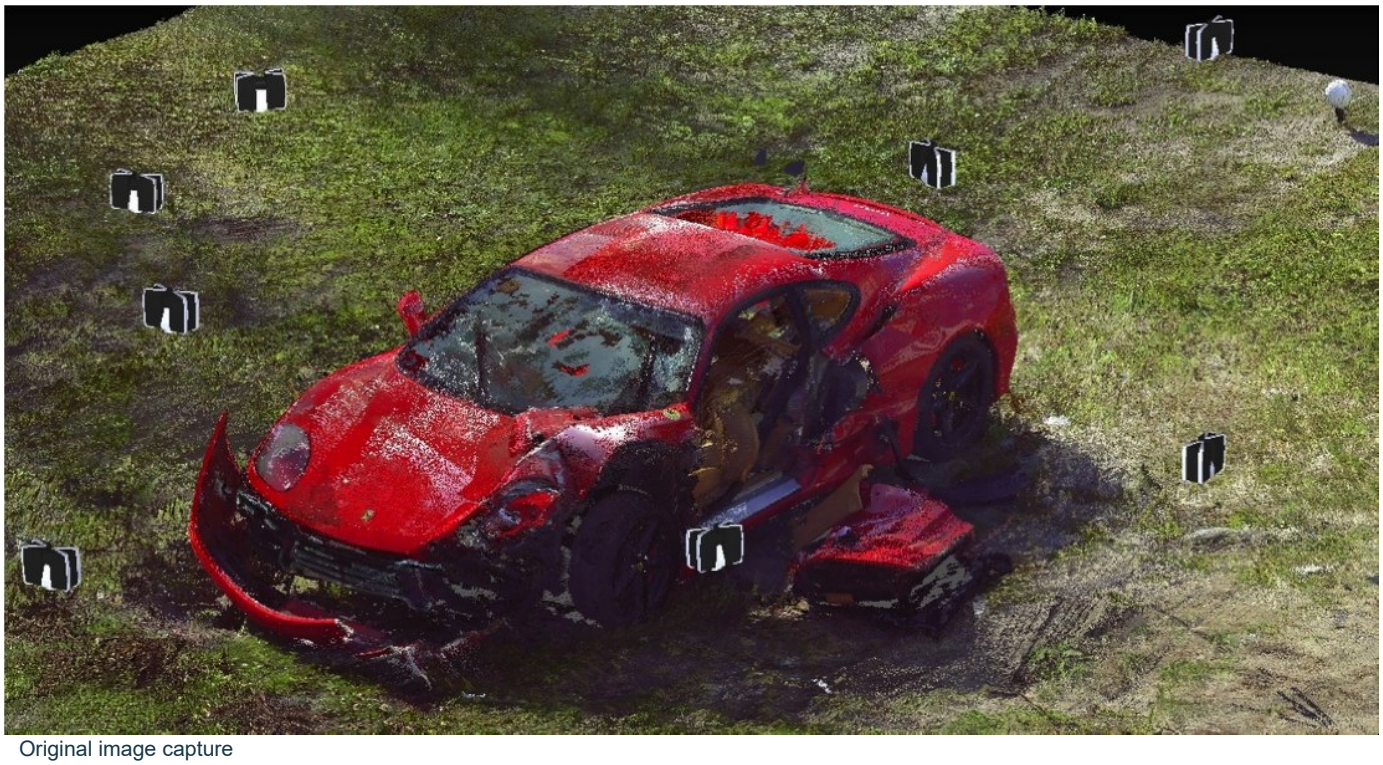
Vehicle and Scene documentation and preservation: The vehicle may be sitting in an insurance lot or police impound or tow yard and the weather and elements are doing their thing. The vehicle may be moved and altered, or the accident scene could change (repaving, or clearing trees or damaged power poles) in the time the case is being decided. Just in the same way scanners are preserving evidence in CSI applications, scanning can prove helpful in preserving accident scenes and totaled cars, as well (I've put together a full white paper on this, if you're interested). You can pull dimensions and cut sections right in your basic point-cloud processing software, or use any number of third-party software applications specifically made for this task.

A conversion like the following can be very helpful in the accident scene reconstruction business:



Original image capture

(Real photo image of my old car, image courtesy of Cortes Towing Service, Longwood, FL)



Original image capture

(Scan 3D view image in FARO Scene 5.0 image courtesy of Atlantic Laser Scanning Services)

The end product can even be as simple as a viewer to be shown in court, similar to Google Street View making it simple to visualize the environment. Many scanning manufactures offer this utility or you can use a panoramic viewer if you export the scan images, like this one.



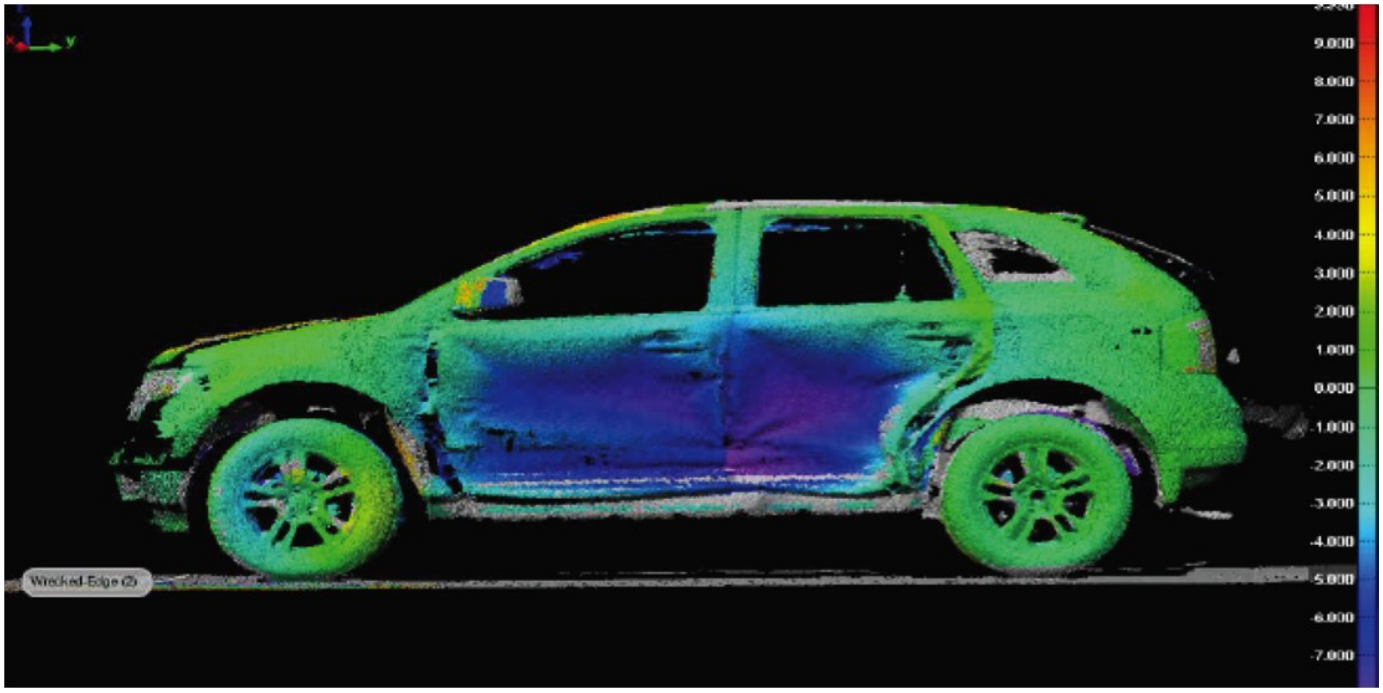
Original image capture

(FARO Scene Webshare, free online viewer www.farowebshare.com image courtesy of Dustin Productions, LLC)

Diagramming and visual exhibits for trial: These end products can vary greatly to be as simple as a two-dimensional CAD drawing representing the scene in Plan view (overhead) or go crazy with a full-blown 3D animated reconstruction like those done by David Dustin:

http://wordp.dustinproductions.com/animation-examples/

Scientific Analysis and Inspection: Some of the more fancy deliverables some companies are offering include inspection of the damaged vehicles as compared to an exemplar vehicle. This can be done by simply scanning the wrecked car and the same model of an undamaged car to represent the “normal” (slip a 20-spot to your local CarMax rep). Overlay the two scans using a CAD-to-part algorithm common in applications like Geomagic. The end result is every ripple or crunch highlighted in a cool color graph or whisker plot to show quantitatively how much damage the vehicle endured. This information is then used in conjunction with crash test data to make a statement about how much force was required to result in that type of damage. Even if you slept through physics class in college (not your beloved author of course) you’d know force equals mass x acceleration … compare that with testimony and now you have some science your attorney is just foaming at the mouth for.



Original image capture

(Example of a CAD-to-part inspection of a wrecked vehicle)

Source and preservation record

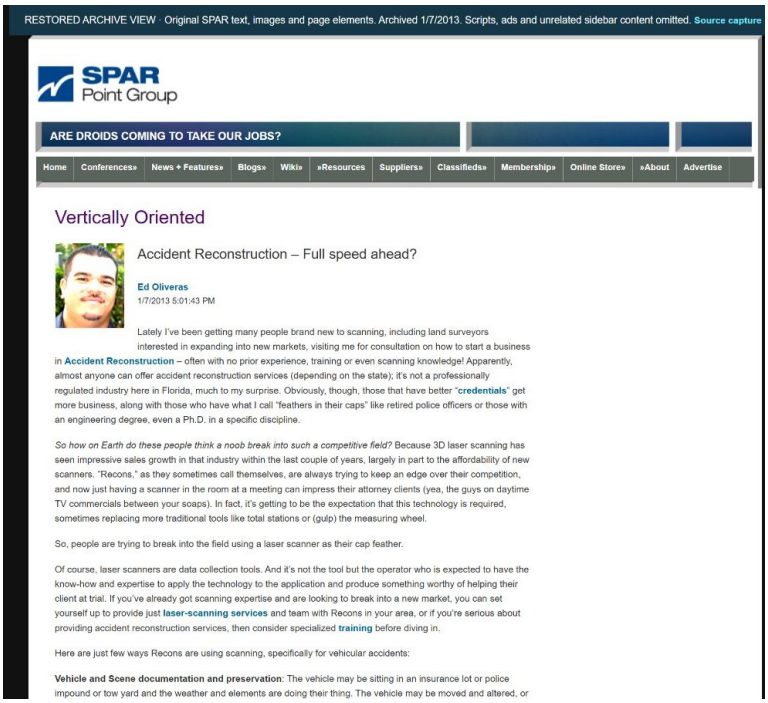
Author: Ed Oliveras. Publisher: SPAR Point Group. Original publication date: 1/7/2013. Captured and preserved from Internet Archive records.

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Open the GO3D article page

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Good insurance? Good coverage.

Ed Oliveras | SPAR Point Group | 1/16/2013



Original fire-damaged residence image from the January 16, 2013 article about Nick Worrell and ALSS.

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In Eddie’s words

> “A while back my customer Nick Worrell, with ALSS, was out scanning a fire-damaged residence in Central Florida… Yikes!!”

> “Laser scanning provides 3D documentation of the insured’s claims, comprehensively archiving the damage and allowing it to be accessed in perpetuity and high level of detail.”

What the dated article records

The article names Nick Worrell as Eddie’s customer and explains scanning a fire-damaged home, estimating repairs and retaining evidence for insurance disputes. The dated text directly supports their professional relationship. Statements about insurance law and evidence are historical views, not current legal guidance.

Historical context

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Complete recovered article

A while back my customer Nick Worrell, with ALSS, was out scanning a fire-damaged residence in Central Florida… Yikes!!

When things like this happen (lightning strike), the first thing everybody says is: “I hope they have good insurance!” Especially when a place looks like this:



Original image capture

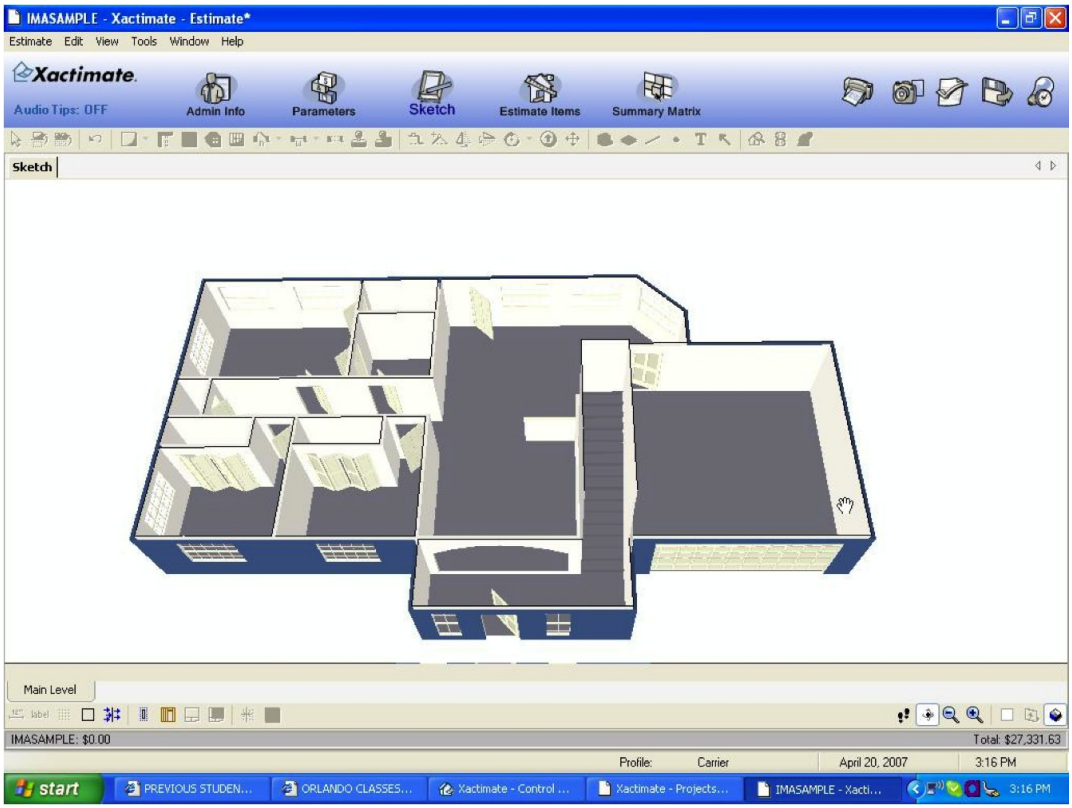
The real question should be: I hope they have good coverage … Because even the best insurance company can’t help you if you’re under-insured, or in some cases the claim will go through “subrogation.” Subrogation is the process of investigating a claim to determine fault or responsibility of a third party, which would then transfer the responsibility to cover the damages; aka, pass the bill! This is how insurance companies recover millions of dollars a year, finding faulty wiring or improper installation or, worse yet, negligence.

So, what’s the 3D angle here? Laser scanning provides 3D documentation of the insured’s claims, comprehensively archiving the damage and allowing it to be accessed in perpetuity and high level of detail.

So why would an insurance company or damage restoration firm look at this technology? Of course, they have their own legacy tools … digital cameras, tape measures and distance meters. The benefit is one that relates across many industries … TIME. No, not the magazine. Time is money. How many times (pun intended) have we heard that? But in this case it can be that and more. Look at the destruction of the tornados in Joplin, MO or the Hurricane Sandy damage in the northeast for example. The insurance adjuster has dozens, if not hundreds, of claims to assess in catastrophic events and it’s a matter of being fast – but accurate as can be by the same token. Scanning inherits both traits of being a camera and a tape measure.

Here's how the data can be used for commercial or residential insurance claims:

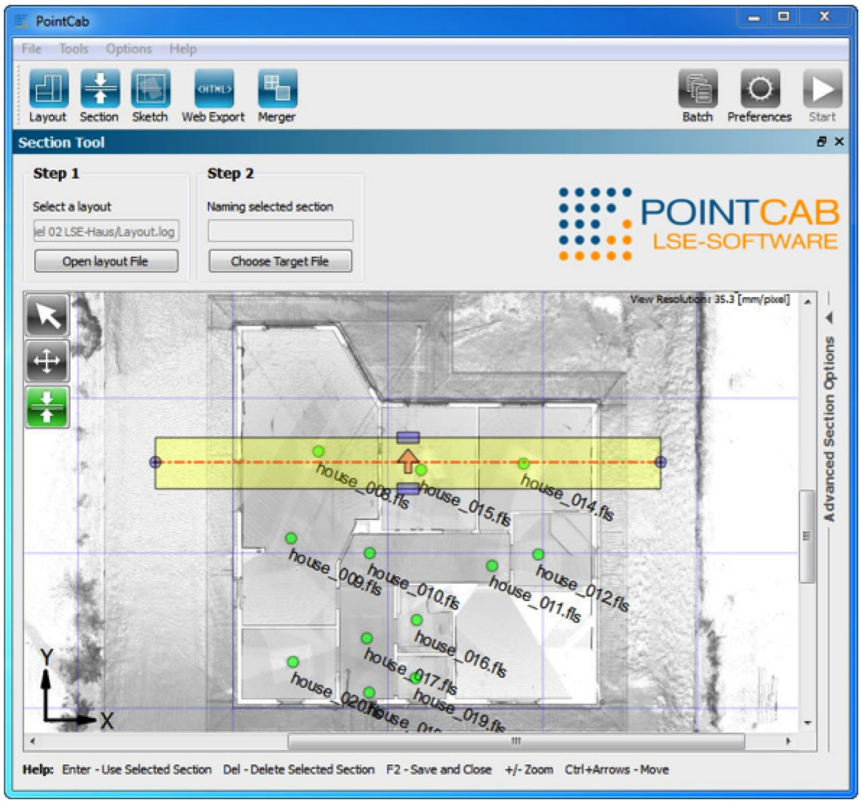
3D Documentation for Estimates: Popular software programs used for estimating, like Xactimate, take input from the claims adjuster or disaster recovery services firm and create a bill of materials, reports and calculate costs.



Original image capture

(image from www.adjusterstraining.com)

High-resolution scan data can minimize the hours used to cross-reference digital photos and measurements taken by hand on a clipboard … the estimator is instead sitting at his desk using his mouse as the tape measure, not in a damaged, hazardous building where he's subject to the elements and unsafe conditions. The estimator can put more time into looking for important clues to the damage than reading the tape measure. The scan data can be imported into these programs by several means, but here's one: PointCab is a simple, easy-to-use program that can convert scans into ortho-rectified image files (flattened jpeg image files) which can then be imported to Xactimate and by assigning one wall a dimension (which is easily gained by a free viewer), you then scale the image and trace over it in the program, adding walls, windows and doors. The elements inside the room are added using the bubble-viewer, like window treatments, furnishings or even flooring or wallpaper.



Original image capture

Subrogation and Audit: In some cases, the claims that undergo subrogation are handled in mediation or, ultimately, arbitration. With disaster recovery firms, they are under the gun to get these facilities back up and running … imagine the losses of a major department store or warehouse that is losing money every day that a facility is down. They are tasked with clean up and rehabilitation, but the insurance firms have their estimate and the recovery firms have their own. Having scan documentation of drywall damage or anything else is a great mediation tool. In addition, if it does go to arbitration, the scans are considered un-tamperable evidence.

Here’s what that evidence might look like:

Videos linked in the original article

Watch original video: 4rgiGiuvfaQ

Source and preservation record

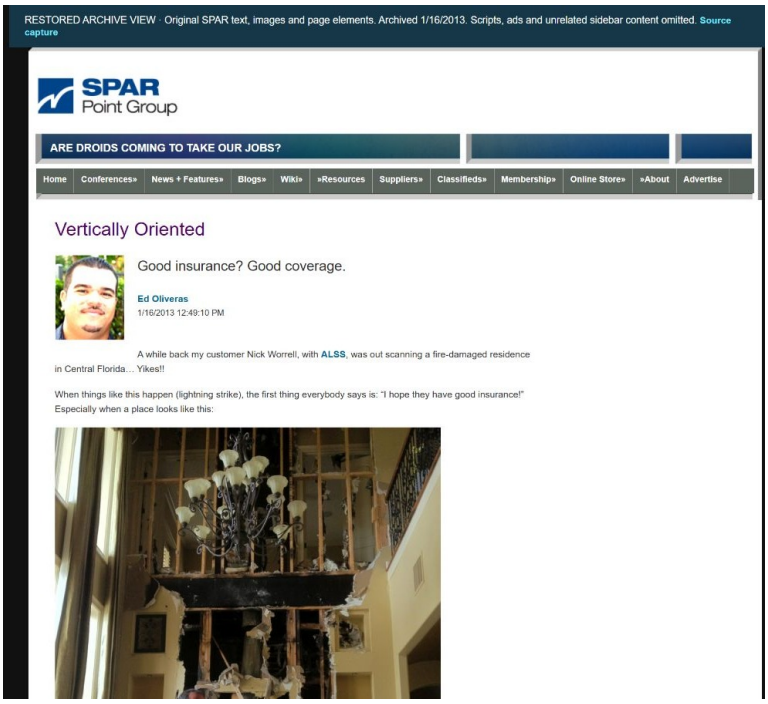
Author: Ed Oliveras. Publisher: SPAR Point Group. Original publication date: 1/16/2013. Captured and preserved from Internet Archive records.

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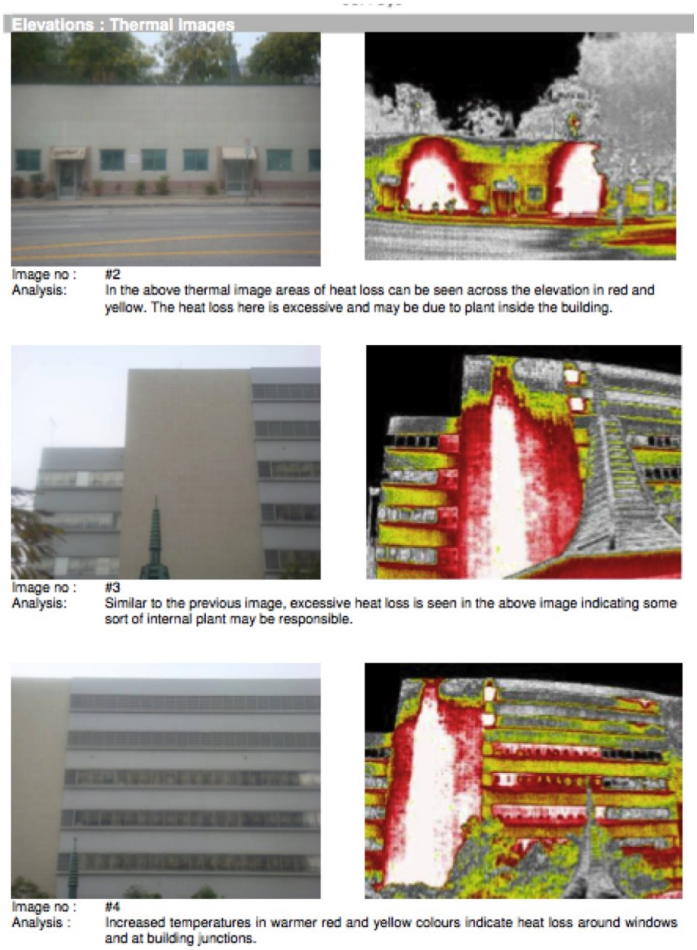
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Heating up the market for 3D data

Ed Oliveras | SPAR Point Group | 1/21/2013



Original energy-audit illustration from the January 21, 2013 article.

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In Eddie’s words

> “This latter topic has intrigued me for years”

> “The best thing about a scan for this kind of application is that the data can be preserved and used again and again for facility management, security, safety - you name it.”

What the dated article records

Eddie connects thermal imagery, point clouds and energy audits, credits Jonathan Coco and other contributors, and considers practical services for building owners. This documents his early public explanation of reusable 3D data without claiming he originated every technique.

Historical context

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Complete recovered article

Recently, here on the SPAR blogroll we saw articles about Google's interest in lidar and a couple of articles on thermal imagery overlaid onto scan data. This latter topic has intrigued me for years and it was reignited not long ago when my friend Jonathan Coco with Engensus posted those Youtube videos of his thermal scan fly-thru animations (which was followed by a spur of interest and submissions by the community).

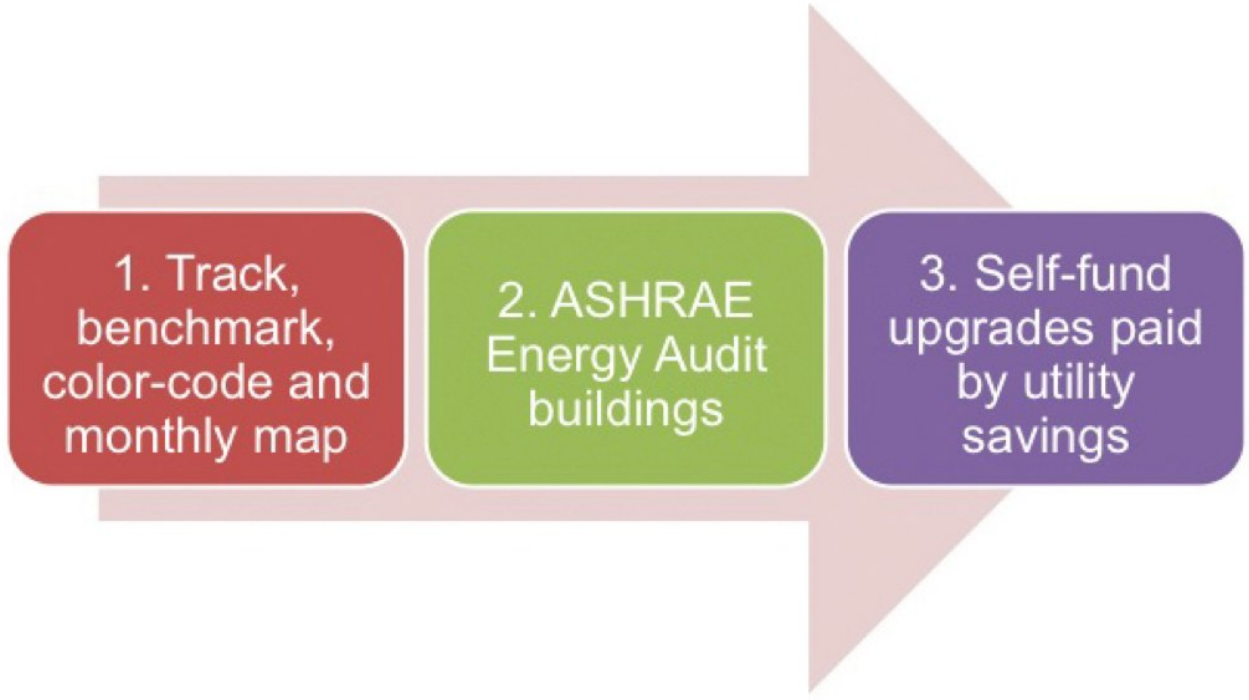
This ought to refresh your memory:

The real question, though, is this: How can this type of information combination be useful? Can it be a billable service or a way for an owner to save money?

Energy conservation, being green, watching your carbon footprint, all that hippy tree-hugger stuff… Is there a sustainable (pun intended) service offering for laser scanning service providers to offer to facilities managers for every commercial or government building across the country? Heck, across the globe? Who doesn't want to make money helping their customers save money and the environment at the same time?

So why would a facilities manager or sustainability director look at this technology? Utility costs can be the second largest expense for a company or institution after labor costs. By modifying their attitude towards energy consumption, or making minor changes to the offending equipment – like light bulbs, insulation, tinting windows, etc… – they can shave off points from their utility bills. (I installed a new a/c about a year ago and cut my utility bill by 30 percent, which of course helps cover the cost of the machine over time and then saves me money in the long run. Maybe I should be a facilities manager…)

Well, this general concept is how service providers like Mark Johnson are able to get a university, or state or federal agency or public school system that has zero money for this in the budget to commit to hiring him. He charges nothing up front and recovers his cost from the utility savings outlined here:



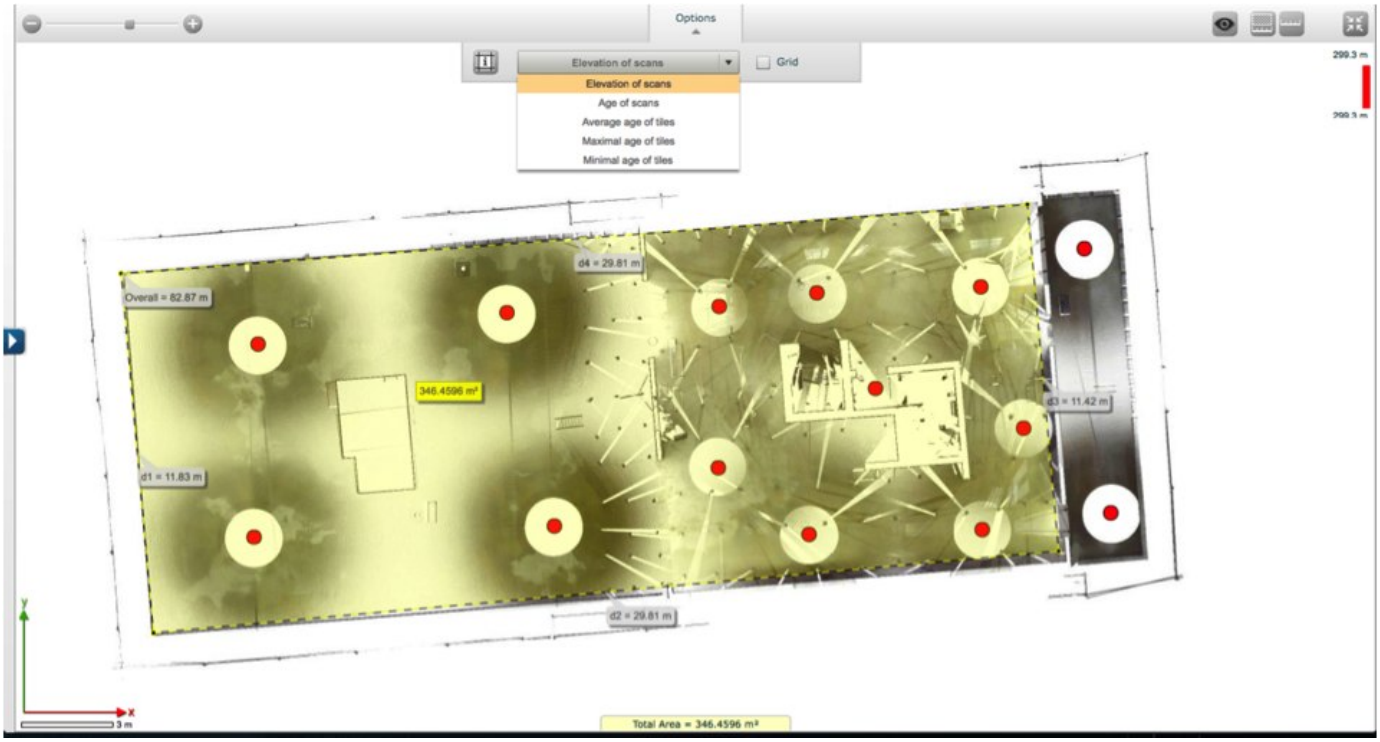
Original image capture

(image courtesy of helpanswers.org)

Here's how 3D scan data can be used for energy audits as well as value-added by-products of the scan:

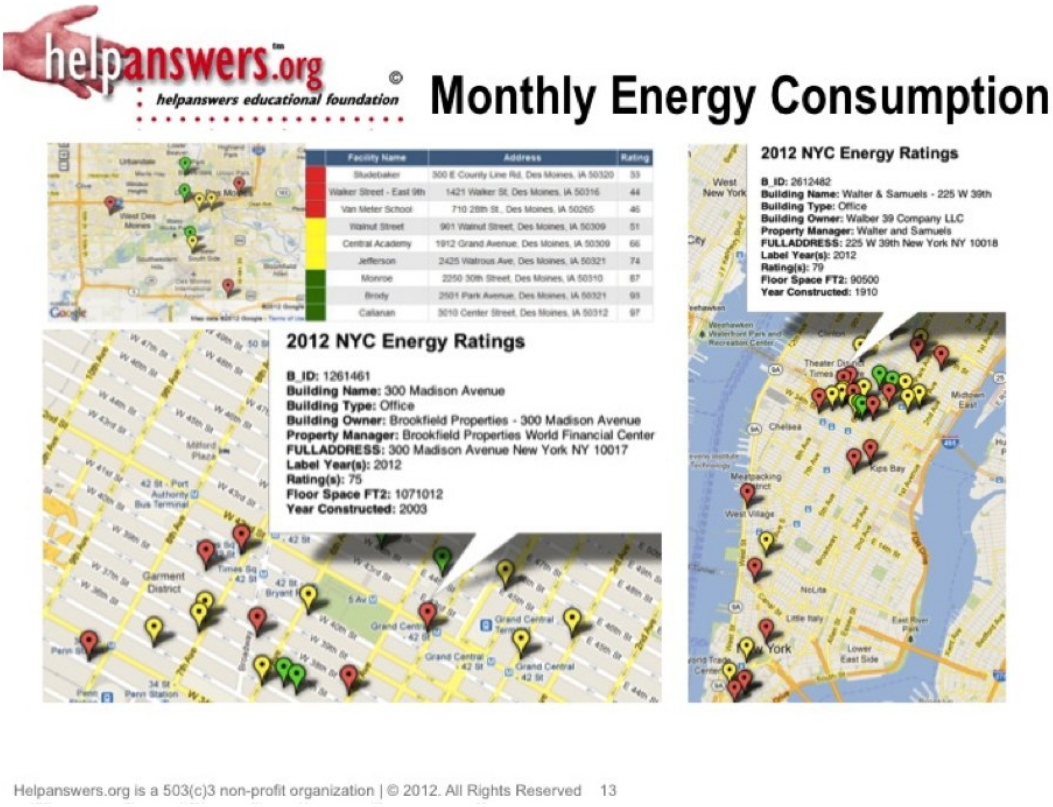
3D Documentation for Accurate Square Footage: I'll keep emphasizing web-based scan data viewers in just about every post here, and here's just one of many benefits: To get an accurate Energy Score, all the methods used rely on up-to-date building information. Many low-efficiency buildings were built decades ago and require some verification to ensure the volume and square footage data you feed into the calculations are accurate. Well, take a scan.

You can even measure square footage right from the viewer:



Original image capture

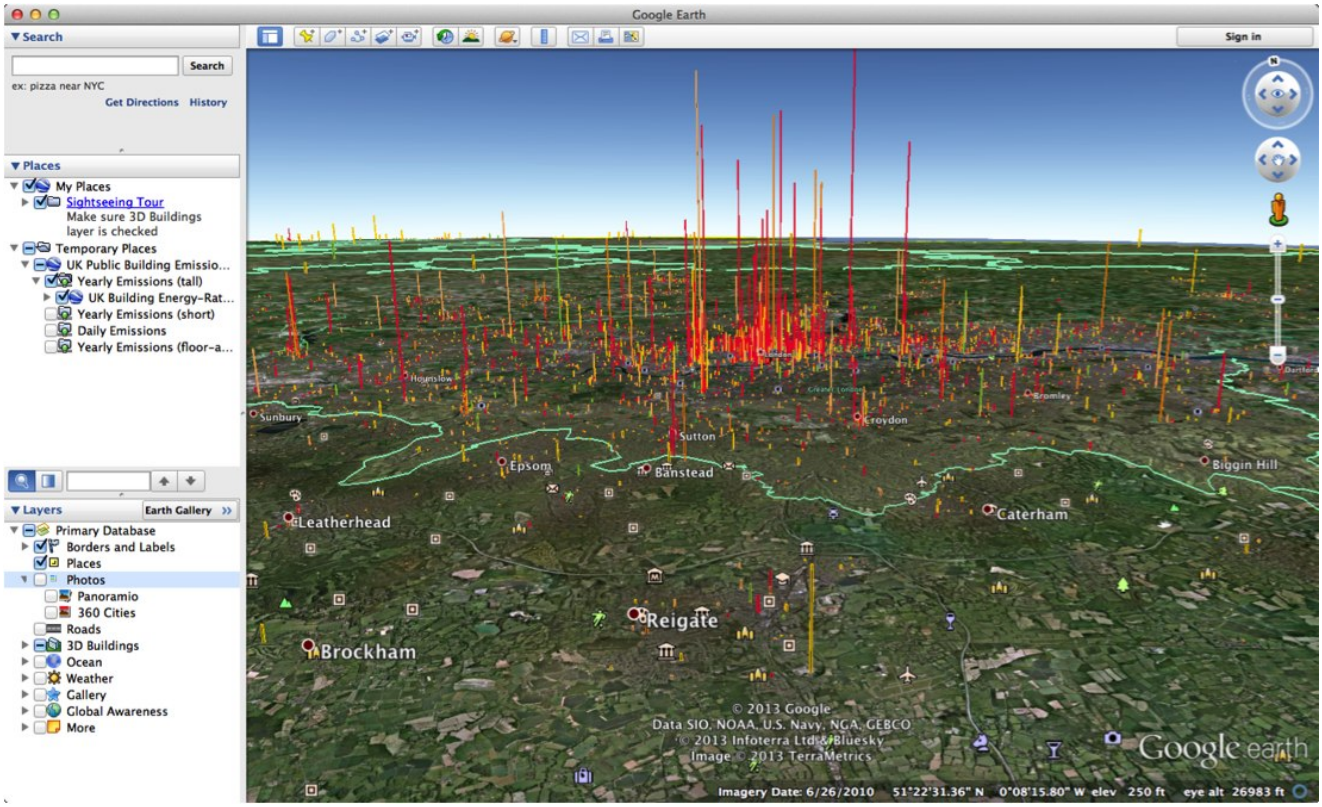
(Image courtesy of FARO Scene Webshare)



Original image capture

(Map of energy scores in Google, image courtesy of helpanswers.org)

This scan viewer can be integrated with the power of Google Earth to hyperlink your online scan database to a portfolio like this one… you could set it up to literally click on a building and click on a link to view the scans. FARO Scene Webshare has the ability to back link to Google Earth also.

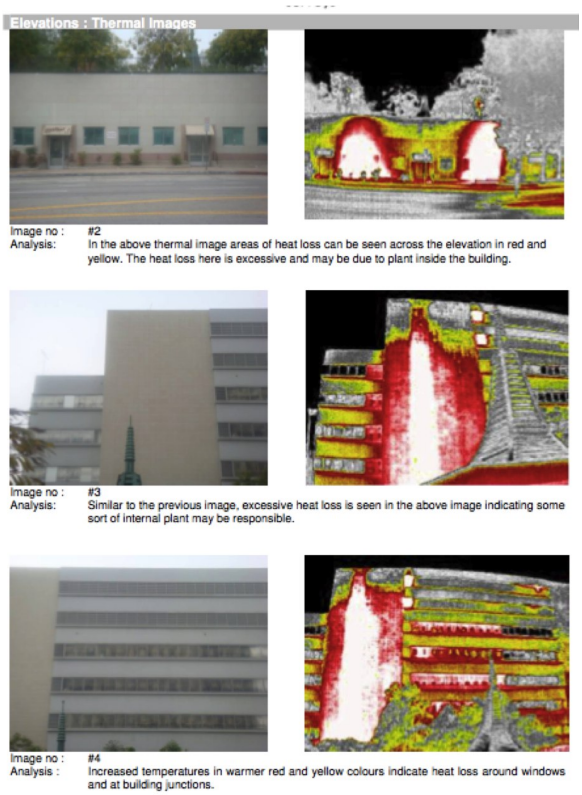


Original image capture

(Map of Actual CO2 Emissions from 40,000 Buildings; image courtesy of Google Earth Outreach)

Facility Energy Audit: If a building has a consistently low energy score, an energy audit can give direction toward a tune-up. Thermal imagery can be captured and overlaid onto the scan data, both inside and outside the building and roof. This information is a visual representation of where money is being wasted and is like evidence in a crime scene where you've got to see it to believe it. The scan data can provide info like square footage of new roofing material for insulation or window areas for tinting film to help determine the cost of the upgrades.

The end result might be something like this:



Original image capture

The best thing about a scan for this kind of application is that the data can be preserved and used again and again for facility management, security, safety - you name it. But maybe that's fodder for another post...

Videos linked in the original article

Watch original video: h_Bi2P29u4o

Source and preservation record

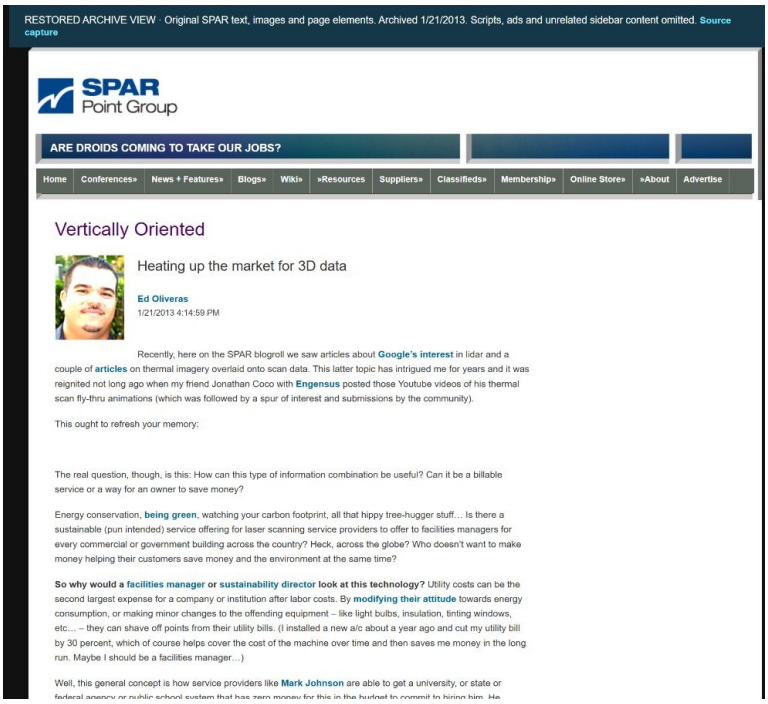
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Blood, Bullets and Lasers… Oh My!

Ed Oliveras | SPAR Point Group | 2/20/2013



Original panoramic scene illustration, credited to 3rdTech in the February 20, 2013 article.

Share or download this PDF · Original Internet Archive capture

In Eddie’s words

> “The idea is we are taking people’s workflow from 2D to 3D…”

> “By capturing the scene in perpetuity, we can “go back in time” as a case evolves and reexamine items that were not important at the time of the initial investigation.”

What the dated article records

This February 2013 article connects crime-scene and traffic-homicide work with measurement, evidence preservation and courtroom exhibits. It names IAFSM and SPAR, describes adoption in Florida and credits third-party tools. It supports an early public teaching role, but does not by itself establish which agencies Eddie trained.

Historical context

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Complete recovered article

The most asked question I get from folks is… “What types of people are buying your scanners?” For the most part it is a good mix, but a large portion of market share has to go to **Forensics** and most especially **Crime Scene Investigation and Traffic Homicide**.

So what unique advantages does scanning have in CSI?

Well, there’s a reason I called my company GO3D. The idea is we are taking people’s workflow from 2D to 3D…

Traditionally, investigators are taking discrete point measurements (point A to B) that are difficult to relate to each other. As well, they are taking photos of the scene, all of just a single point of view. I’ve seen cases where not enough measurements were taken, references were placed to temporary items, similar to this video about a cold case here:

The idea is that the machine takes the measurements, leaving less room to scrutinize the investigation team for errors. The new scanners are small, portable and easy to learn and use. I compare them to DSLR cameras that are very powerful but almost all of them have a “full auto” button. Modern scanners do as well… and these scanners are often described as simply a 3D camera. Each pixel in the image represents an actual measured point; and by creating panoramic scans, one can document an entire room or intersection quickly and easily with a very small learning curve. Since it uses a laser, no ambient light is necessary to produce a reflectance image (greyscale intensity), but lighting is necessary for color scanning using an onboard bore-sighted camera. There are advantages for both sensors in CSI: The laser image can reveal things like what 20-day-old paint reflects vs. 20-year-old paint on a wall that may be a hiding place. For traffic homicide, the laser reflectance image sometimes doesn’t reveal skid marks on asphalt like a color camera will.

Laser scanning for CSI means there is less “interpretation” involved in field measurements and anything in the scene can be evaluated. It reduces the need for site revisits and it helps prevent inaccurate measurements or the common mistakes that plague us as humans. Who knows what people might miss in the moment, but find in the digital revisitation? By capturing the scene in perpetuity, we can “go back in time” as a case evolves and reexamine items that were not important at the time of the initial investigation. Using our mouse as a tape measure, we can remotely analyze evidence without disturbing the scene, which reduces the burden on investigators.

So here’s a just few ways CS & TH investigators are using scanning:

Scene documentation and preservation:

Here’s a real scenario for a traffic accident. I’ll give you some time to go read up and return. All set?

The results of the scan produce panoramic images like this one.



Original image capture

[Image courtesy of 3rdTech www.3rdtech.com]

Each pixel can be measured in 3-dimensions (x, y and z). The process to collect evidence varies by agency, but normally scans are taken before processing the scene and then when evidence markers and reference measurements are set in place. The last few terrible shooting incidents here in the USA and abroad have been laser-scanned. Scans are automatically linked together to create a composite “point cloud” that fills all the shadowing created by line-of-sight obstructions.

The end product can even be as simple as a viewer to be shown in court or for document control, similar to Google Street View, making it simple to visualize the environment. You can even put the data on a thumb drive to give to the district attorney if needed. Many scanning manufactures offer this utility or you can use a panoramic viewer if you export the scan images, like this one. All that’s required is an internet browser and an online connection if the data is hosted offsite.



Original image capture

(Image courtesy of Dustin Productions, LLC)

Diagramming and visual exhibits for evidence documentation: These end products can vary greatly, from something as simple as a 2-dimensional CAD drawing representing the scene in Plan view (overhead) or more advanced final deliverables like those used in film and gaming:

Simple diagramming tool: http://youtu.be/oKbtC92vAeU

Real-time 3D shooting reconstruction: http://youtu.be/NdaWmZgmf3s

Here's a list of the current programs that can import scan data:

3rdTech: www.3rdtech.com CAD Zone: http://www.cadzone.com/cz-point-cloud Visual Statement: http://www.visualstatement.com/en/Products/EdgeFX/PointCloudEdition.aspx ARAS 360: http://www.aras360.com/ Clouds2Max for 3DS Max: www.clouds2max.com MapScenes: http://www.mapscenes.com/ AutoCAD, Microstation, Rhino

Scientific Analysis and Inspection:

Today, as scanning is moving past the early adopter stage and much more accepted (Florida alone has over a half dozen agencies using the FARO Focus3D and even more private accident reconstructionists), there's now a body of knowledge amongst the peer community to help create best practices, specialized accessories and even coursework for high-end animation and reconstruction.

At the SPAR International Conference in Colorado this April, you'll have a chance to attend sessions with this community to see this first hand and discuss with them their techniques. Present will be an organization called IAFSM – International Association of Forensic and Security Metrology – which is helping to develop the content of the sessions and is itself a valuable resource for forensic-scanning information.

Videos linked in the original article

Watch original video: Sav72l4qX7M

Source and preservation record

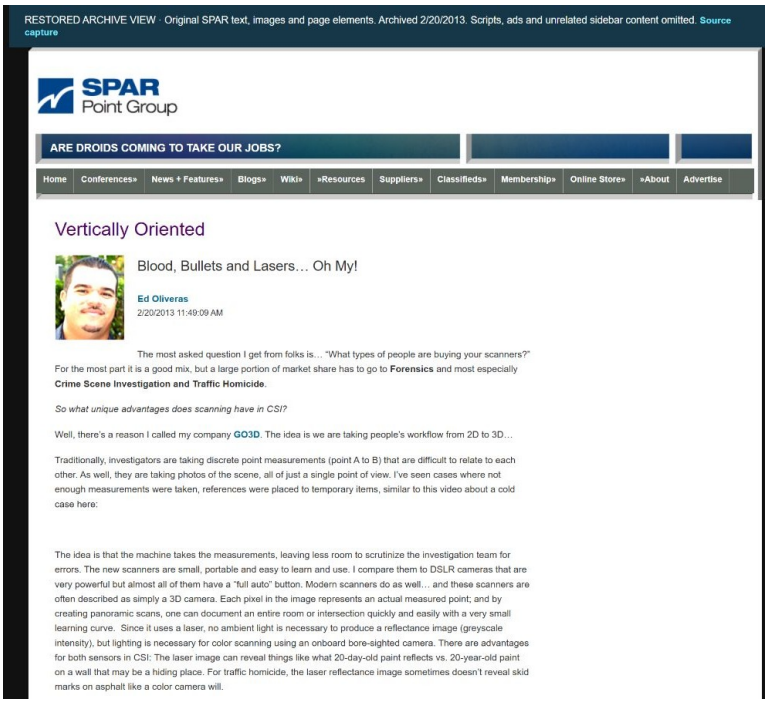
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Clouds become stars… 3D scanning in entertainment industry

Ed Oliveras | SPAR Point Group | 3/21/2013



18th hole at Arnold Palmer's Bay Hill course in central Florida. Image courtesy GO3D, March 21, 2013.

Share or download this PDF · Original Internet Archive capture

In Eddie’s words

> “I’ve been lucky to have worked with a few studios and now supporting a local customer EA Tiburon, the design team for games like Madden and Tiger Woods, right here in Orlando.”

> “Together, we’ve solved lots of technical issues relating to how the current industry consumes point clouds — and identifying the lack of tools thereof.”

What the dated article records

Eddie describes supporting EA Tiburon, solving point-cloud workflow problems and using scans in film, games and simulation. The original images and credits place the article in its 2013 context; named companies are historical references, not present-day endorsements.

Historical context

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Complete recovered article

A popular application of 3D laser scanning technology is in the film, gaming and simulation industry.

Here in Orlando, we're a hub for military simulation with the University of Central Florida Research Park, Full Sail University as well as DAVE School right in our backyard. All the FX houses are incorporating some type of scanning and digitizing like character motion capture, body scanning and in today's discussion: **show set capture and digitization**.

In big blockbuster movies you'll see scenes where the character narrowly escapes death by the skin of his teeth and blows up half a historical landmark in the process… how do they get away with that? It's costly to build sets and blow them up: just ask the producers from Waterworld. The idea is that these one-of-a-kind environments get star treatment digitally. Using 3D laser scanners and photogrammetry tools to capture reality, the modeling team can put an environment together in a fraction of the time and in much greater detail and accuracy than ever before.

So, how are FX studios using the data now?

I've been lucky to have worked with a few studios and now supporting a local customer **EA Tiburon**, the design team for games like Madden and Tiger Woods, right here in Orlando. Together, we've solved lots of technical issues relating to how the current industry consumes point clouds — and identifying the lack of tools thereof.

The data collection side seems to be the easiest part these days with simplified scanning workflows.

The *real* issues lie in downstream software processing. In EA's scenario, they've developed some amazing tools themselves… and continue to refine this process. Check it out.



Original image capture

(18th hole at Arnold Palmer's Bay Hill course in central Florida, image courtesy GO3D)



Original image capture

(Overhead view of 18th hole at Arnold Palmer's Bay Hill course in central Florida, image courtesy GO3D)

Here's an older clip of Remnant Studios in CA working with our first gen scanner.

They aren't the only ones using scanning; here's Activision scanning in Florida.

Another "power user" is Scott Metzger, an accomplished visual effects artist who has a nice technical video he shares with his use and application of 3D scanners in conjunction with the dizzying conversion and modeling programs used to make such high quality digital media.

Check out the video here.

So, there are benefits to this renaissance of companies embracing scanning as their primary reality capture tools … the trickle-down effects of these big shops with big budgets force the hand of the major design packages to play in the point cloud sandbox. Autodesk acquired Alice Labs a while back, enabling users to one day have "unlimited" point cloud visualization capability in their native packages including CAD. "Unlimited" is not a word we scanner-heads are used to hearing; but there's some truth to this. With multi-core processors and true 64-bit hyper-threaded applications, this is soon becoming a reality (pun intended).

Another example of mainstream “tricklization” (trademark Ed Oliveras) is how new scanning users are creating their own apps and viewers for scan data without waiting for the big boys to do so. Clouds2Max is a point-cloud plug in for 3DS Max.

A complimentary yet stand-alone product is Click-VR, which is a stand-alone real-time 3D rendering application that allows you to work with the cloud in a “pre-rendered” format. Those who are not in the 3D animation biz may be scratching our heads, but you know that short amount of time that the cloud goes fuzzy while you spin around in your 3D viewer? Yeah, that’s “rendering”… pre-rendered means there is no lag, no regeneration time with full point cloud display and access. Most importantly, with further tweaking and the right workflow, this can be used as a true simulation tool, like this example.

As we speak, many of the sports stadiums across the country are being scanned to generate a portfolio for these game companies.

How cool would it be to play HALO with a game map being your local park or your office? Hmmm… sounds like a nice service offering to me. Do you think the corporate execs at Activision, EA and others might be thinking the same thing (wink, wink)?



Original image capture

(Image courtesy of Atlantic Laser Scanning Rentals)

Source and preservation record

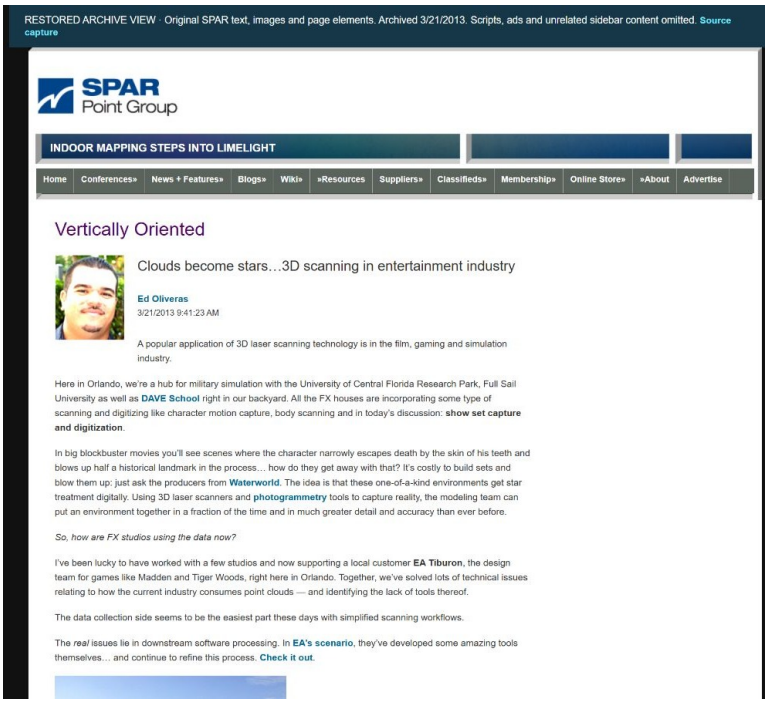
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