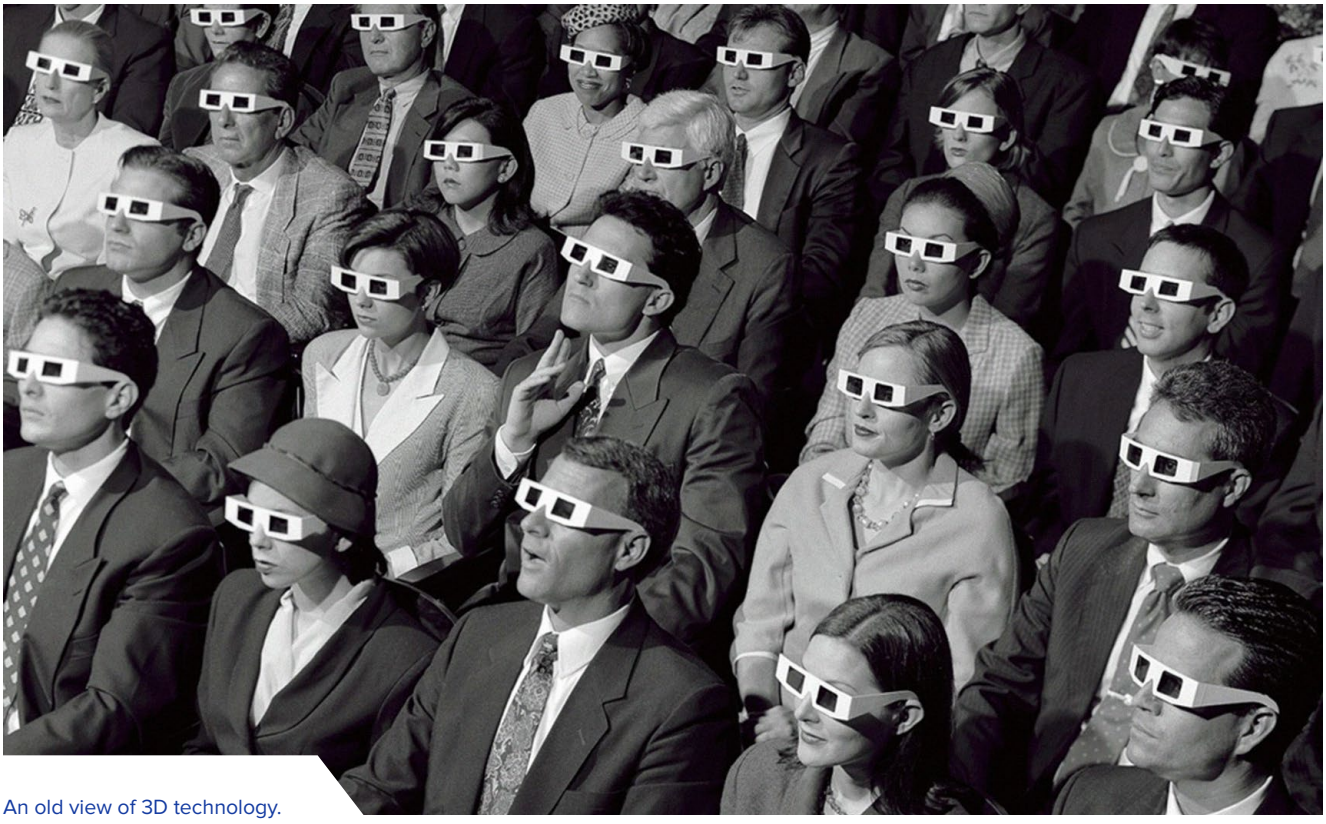


An old view of 3D technology.

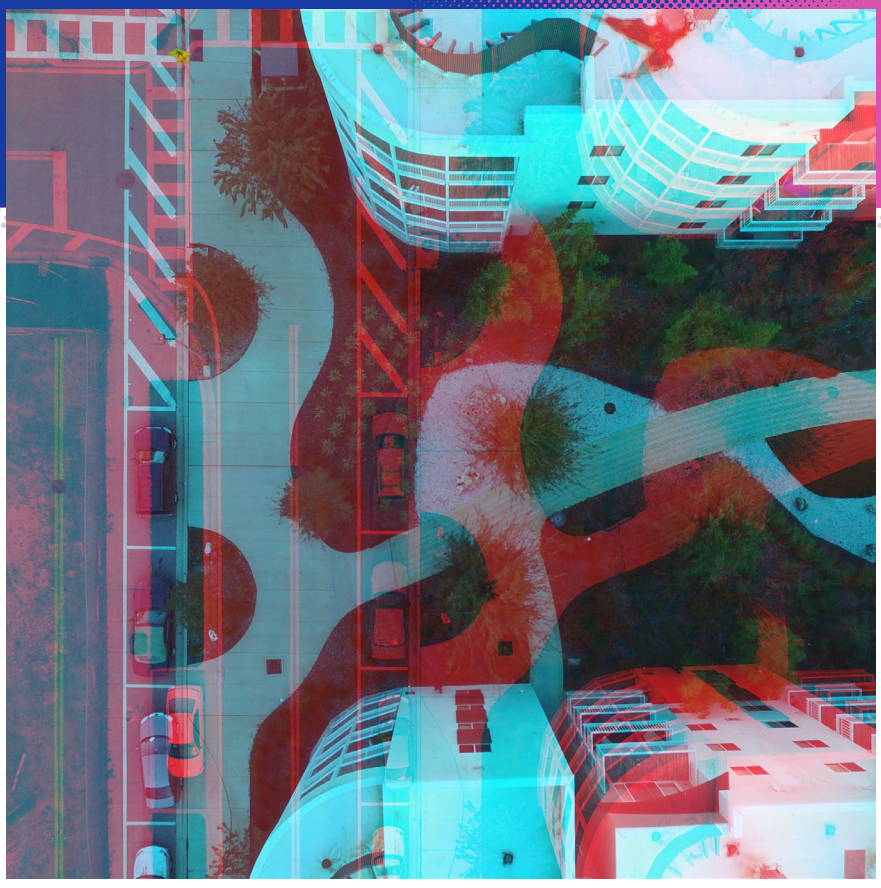
# Remember Stereo?

No I don't mean your Dad's old Akai Stereo Component System that he brought back from a tour in Japan with the dials and meters that you weren't allowed to touch for any reason. Wait I'm just dating myself here, let me start over. Break out your Walkman and one of those C-120 mix tapes you made. Corrosion destroyed it you say? Or was it you felt embarrassment in mixing Janice Joplin's "Son of a Preacher Man" up against the Daz Bands "Let it whip" followed by the Dream Academy's "Life in a Northern Town" in a failed attempt to show emotional range. OK then pick up one of your favorite CD's…no? Gone? We'll you probably have a drawer full of iPods or other streaming gadgets somewhere. What not charged, haven't touched them since 2006? Everything is on your phone now, or actually in the cloud? I'm going somewhere with this.

In every sentence above we progressively lost something. Fidelity or quality. Some of it was barely noticeable, and depending on your generation never known. On the flip side, we also gained a lot of things. Space for one thing. No longer do we have shelves full of Albums. Tapes, CD's even a drawer's worth of streaming devices, by not


The delivery of music from Albums to iPods… yes I'm from the 80's.

BY ERIC ANDELIN



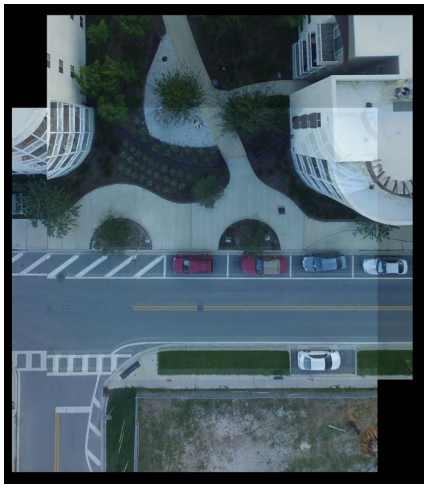
Anaglyph images from overlapping images created using GIMP. Poor mans stereo, required those sexy red/blue glasses.

having those iPods laying around. Perhaps even more importantly we gained convenience and the ability to pay for only the music we want at prices we are willing to pay. Freedom of choice right? We can, and do forego higher quality and ownership for that matter for convenience and cost.

So what does this have to do with geospatial? Why am I talking about music in LiDAR Magazine?

We are going through a similar transition in what is currently still a profession, geospatial services. The introduction of Unmanned Aerial Systems (UAS) and the influx of new talent not mentally restricted by old mantras of process, professionalism and accuracy are pushing the profession in a new direction. The 90 year old surveyor out there (and really are there any youngers ones these days…just kidding is probably saying, been there! Damn Photogrammetrist! For the new UAS crowd: A Photogrammetrist is someone who practices the science of making measurements from photographs.

So let's look at Photogrammetry, the science of making measurements from photographs. I found photogrammetry by accident, I had one of those cool dads (with the Akai component stereo system) who would occasionally bring his work home with him. Usually this was a handful of 9x9 images that could be overlapped to display in stereo (stereo pairs) to create 3D images. Mostly they were of coastal erosion in southern California, but one time he showed me a stereo pair of Disneyland… Imagine if you will a world without Google Maps at your fingertips, but here I was looking at the happiest place on earth from 1800' in 3D. I was all in. That was the kernel that sparked my interest in photogrammetry and brought me down this career path.



Overlapping images create an area known as a stereo pair.

Fast forward (FWD >> on your cassette players) and consider the changes over the last 40 years in photogrammetry. We've gone from stereo pairs in analogue machines that took up whole rooms and looked absolutely frightening, to soft copy workstations that would flicker stereo pairs on a monitor at a rate so fast you could not perceive it. From a truly mechanical model using photographs (dia-positives on glass plates) to scanned images in workstation. Some would argue we lost some fidelity or quality in that process. The math and science behind it is still pretty much the same…we've added some convenience. All through this process, we still had stereo pairs and the ability to view our work in 3D.

Today in most UAS based mapping software solutions we forego the stereo component (not the science) and allow algorithms and computing power to produce digital surface models and orthoimagery. Although there is a wow factor in the final result produced from these packages, I feel like something is missing. I overheard another photogrammetrist reminiscing in a presentation the other day that on a good day, he could capture @ 360 points per day. By hand basically 1 per second, allowing

Automatically Generated Point Cloud gemerated created from multiple overlapping images based on the principals of photogrammetry

time for the obligatory naps caused by monotony. He then pointed out that the latest and greatest LiDAR system could produce the same amount of points in a second. What I thought was lost in that discussion was that those 360 points he collected versus the LiDAR were enough to produce the same quality of map. The difference…human interpretation.

Did he just bait and switch us with LiDAR? Nope, Semi Globally Matched/ Image Based Point Clouds are very similar in size and density to that of LIDAR. Actually, they are much higher in density than most airborne LiDAR systems.

This year the Black Keys released a new album…ALBUM! Not CD, not Stream, but actual Vinyl, and only in Vinyl. There is a growing interest in albums and turntables again. I must give kudos to those who have grabbed the UAS mapping software market. They thought outside the box, simplified processes, brought pricing models that are more in the comfort zone of their users, and aligned themselves with partners to offer a complete end to end solution. They also provide excellent customer support, tutorials and documentation. If only people would read.

However, when an automated process fails and the end user doesn't have the experience to understand where the error comes from, all you can do is reprocess and hope the results are different. Quick someone look up the definition of insanity?

This is where the photogrammetrist gets the phone call. It goes something like this" Help I've fallen and I can't get up". Ok that's my interpretation. Actually they call not understanding why their software isn't producing the map that they were expecting. One reason albums are making a comeback (however small) …Artwork! Maybe we lost too much in the transition to streaming media, or a component no one thought was important or valuable. Maybe the same has happened to mapping.

Maybe things have been over-simplified? What if we brought the stereo component back into mapping software? The math is in there, an interim output for conventional stereo mapping, interpretation or QC would be great. Seeing is believing, and the ability to see your work in stereo as a part of the mapping process is (in my opinion) still a valuable component of photogrammetry. Perhaps those old school photogrammetry software companies should rethink their business model and capture a portion of the UAS propelled market.

Don't get me wrong, I don't own any albums…wait I do, but I wrote this while sitting dockside at sail pavilion where I get free wifi. Earbuds in and Google Play streaming Hot Chip's "Ready for the fall".

**Eric Andelin** is President and CEO of Vertical Information Services, Inc. (VERTX)

Cardinal Systems VrTwo a modern example of a stereo photogrammetry workstation.