The Florida Surveyor

Volume XXVI, Issue 2

February 2018

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President's Message

As 2018 gets underway and all of us are no doubt very busy in our respective businesses, FSMS continues to grow and implement changes for the future. Membership renewals and new member applications came in very strong during the month of January, so please, if you have not done so already, get your dues sent in. Spread the word to your fellow chapter, associate, and affiliate members to join us in our mission to grow, enhance, and protect the surveying and mapping profession in Florida.

Identifying the need for change in any organization is a healthy practice, but implementing that needed change is sometimes an uncomfortable step and can stretch out your patience and time. With the help of all of your input and continued communication, the administrative staff and officers of your society are putting into motion the changes and restructuring needed to keep us relevant to the profession, so we can keep growing and moving forward.

Some of you ran into issues while trying to pay your dues on our website. I am happy to announce that we are currently transitioning to a new website that will fix several issues and help us to better keep track of all FSMS-related transactions. MemberClicks – our new website host - will also allow you to access our website on your mobile devices easily and quickly. We are confident that once we have the new website up and running, many frustrations you may have experienced with the old website will be eliminated.

The FSMPAC is also going through changes for the better in 2018. Smith, Bryan & Meyers, the firm of society lobbyist David Daniel, has agreed to take over the administration of our PAC for no additional charge. This is great news, as it will relieve our volunteers and society staff of a burdensome workload that included tedious clerical filings and paperwork. It will allow us to focus more on fundraising and growing our PAC in order to promote and protect the surveying profession. This transition will be completed in the next few months and an announcement will be sent out. Our PAC is very important to all of us in the surveying and mapping profession in Florida, and making this change, in my opinion, will ensure every cent we contribute to it in the future will be put to use in the absolute best interest of all of us.

Last but not least, I want to update everyone on our educational seminar offerings and presentations. We elected not to have a winter education conference this year in lieu of working on new seminars, new topics and revising the old ones to be more relevant in the current and future surveying and mapping world. If you have a topic you would like us to provide a seminar on, or if you would be willing to present a one, three, or six-hour seminar on behalf of your society, please contact me or the FSMS office and we will do our best to ensure it happens.

"If you want something you've never had, you have to do something you've never done"- Thomas Jefferson

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Reminiscences of an Old Surveyor

Measuring a Distance by Taping

Part I

Knud E. Hermansen, PLS, PE, PhD, Esq.

I don't like to think of myself as old but I am. I have been surveying for close to 50 years. The difference between how I used to survey and how surveying is done now is different. This difference was brought to the forefront of my thinking one day when I was surveying with a young surveyor. As we compared the distance we measured between two corner monuments to the distance set forth in the original survey performed in 1968, the young surveyor was appalled that the original surveyor was off six tenths of a foot between the two monuments. Until this young surveyor spoke I was thinking that the 1968 surveyor had done some exceedingly good measuring given the fact that the distance between the monuments was almost 2,000 feet across uneven landscape filled with puckerbrush. My young associate had never used a tape to measure a long distance. Had he done so, I think that he too would have marveled at the accuracy of the 1968 surveyor.

I would be surprised to hear that any surveying firm operating at this time still tapes long distances. If there is some firm that still practices this ancient art, surely they cannot compete on a fee basis with another firm.

So my young colleagues in the profession will better understand how the boundary they are now retracing was measured, I will reminisce about the lost art of taping a long distance.

Taping required at least two people in the survey crew. Three were ideal, with a person on each end of the tape and one person on the instrument to keep the two people on a straight line between the end points.

My employers at the time were somewhat tight-fisted with expenses so most of my taping was done with one other person.

With the direction to be measured selected, a distant object was chosen to use as a point of reference to guide us while taping. I suppose when taping across open land, a pole was included as part of the survey equipment. The pole was placed in the ground on line with the direction to be taped and used to guide the taping crew. Where I surveyed there was always some natural object that could be used or an appendage of a tree or bush where ribbon could be hung to serve as a guiding point.

Unless we were in farmland or urban land there followed some physical labor as brush and other vegetation was cut and removed from the direction to be taped. Of course if the distance to be taped was part of a traverse, the direction of the traverse was often selected so as to avoid the denser portions of vegetation thereby saving a great deal of physical labor involved with cutting a traverse line. If memory serves me, I seem to remember more time spent cutting a clear a line in preparation to taping the distance than actually measuring the line.

My employer favored a 200 foot steel tape. Most surveyors employed the standard 100 foot steel tape. I heard of a few surveyors that employed a 300 foot steel tape. The longer tape meant fewer markings on the ground that I shall explain later. However, the longer tape made a wicked sag unless extra tension could be exerted on the ends of the tape to reduce the sag. Of course the extra tension made plumbing the tape more difficult. Still, I came to appreciate the longer tape and used it when I first practiced on my own after becoming licensed.

Now I will say here and now that I was well familiar with tape corrections such as sag, tension, and temperature. We never made those corrections nor do I remember a surveyor that I met at this time that did so though they were common subjects in academic learning. I do not believe these calculations were omitted from ignorance. It must be remembered that calculations during these times were done without benefit of an electronic

calculator. As a result, any calculations involving multiplication and division were a tedious undertaking.

Also, the errors associated with the failure to make tape corrections were often as not dwarfed by other factors present in the boundary survey. Would a temperature or sag correction to the steel tape make much of a difference when the corner monument was a 22 inch diameter tree or a three foot diameter stone pile?

My employer did deem it important that the taping be done on a straight line and as near to horizontal as possible unless the end of the tape could be placed at the instrument allowing a vertical angle to be read and used to reduce the slope distance to a horizontal distance. I do not remember ever employing a hand level to check to insure the tape was horizontal, the level of the tape being accomplished by a fair estimate with the eye.

Leveling the tape required a plumb bob be suspended from at least one end of the tape and usually at both ends of the tape. Even on relatively level ground it was necessary to suspend the tape above the ground and employ plumb bobs or else the tape would weave up and down over brush we had cut, fallen trees, stones, and high grass that was normally present on the line of taping.

I don't believe a plumb bob can be found among the equipment of the modern surveyor. Perhaps it may be found buried in the equipment box on the survey truck yet. The plumb bob does not hang from the belt of the surveyor like it did decades ago. To come to the field without a plumb bob was a serious omission – akin to forgetting the tripod. Not only was the plumb bob necessary for taping but it was a necessary piece of equipment to hang under the tripod in order to place the instrument over the point, the optical plummet not being present on transits and compasses that were used to measure directions at that time.

Beginning at the instrument, the tape was laid out in the direction to be measured. Perhaps laid out is the wrong word - for the procedure was to grab the 'zero' end of the tape and drag it in the direction to be measured until the rear tape person would yell "stop" or some other recognizable command. Now in doing this simple task it was important that someone watch the tape or at least be sensitive to the resistance to the drag offered by the tape to prevent the tape from looping upon itself where continued tension would cause the loop to collapse and the steel tape to break. Careful observation was especially important when turning the tape back upon itself. Breaking a tape would cause the ire of even the most placid employer because there was no reason for this event to occur but for negligence. I am sure some survey crew members did try their best to think of some other plausible excuse that would explain a broken tape and not attach blame to themselves.

Having dragged the tape to its farthest extent without causing the tape to break, the forward tape person would be directed to the right or left by the rear tape person so as to cause the forward tape person to be on a straight line between the two points where the distance was required. This is where the pole or point of reference spoken of earlier assists the taping crew.

More times than not it seemed this simple task would reveal that the forward tape person had passed on the wrong side of a tree or bush requiring the forward tape person to drag the tape back to the offending tree or bush and pass on the correct side of this transgressing vegetation. Surely if the tape did not kink or break in laying the tape out, the risk of a break by kinking the tape increased with this realignment because the forward tape person was looping the tape back upon itself and was now agitated with the extra effort necessary to make the measurement. In their frustration they would tend to pull on the tape harder than good practice should allow.

In some instances, it would be determined that rather than drag the tape back and go on the other side of the offending vegetation, the vegetation could be cut and removed. This idea was good in theory but often fraught in practice. More than once I have seen a good swing of the machete or brush hook designed to cut the offending brush not only cut the brush but go on to cut the tape as well, the tape being next to the offending brush because of the circumstances I have mentioned.

It was always a discussion among survey crew members whether the employer will think the intelligence of an employee to be less if they broke the tape with an overlooked kink or the result of a powerful stroke of a machete. Thankfully that is one conversation and confession that will no longer occur with modern survey practice.

Once satisfied the tape is aligned properly in the direction of the survey, the tape would be raised off the ground in a manner to effectuate a level line. In raising the tape, the taping party often discovers that the recent maneuvering with the tape has allowed the tape to seep under some brush that had been previously cut in clearing the line and allowed to remain in the vicinity. The discovery of the offending

vegetation occurred when an effort is made to raise the tape and one or more pieces of brush would also rise with the tape. At this discovery some vigorous attempt is made at shaking the tape to throw off the offending brush. This effort seldom worked other than to jerk the end of the tape out of a person's hand.

With the failure of shaking the brush off, it became necessary for someone to once again walk along the length of the tape and remove offending pieces of brush that had found their way to laying on the tape rather than under the tape.

If a person is following this story and is counting the trips along a particular segment of line, they will realize that the distance of the tape has probably been walked three or four times. First, a person must walk the line to cut a clear sight along the line. Second, a person will walk the line to drag the tape to set up the measurement. The third walk occurs when retracing the steps in order to come back around the correct side of a tree. Finally, the fourth walk of the line is to throw off brush and vegetation that has climbed on the tape. I know that vegetation can't move or climb on its own but if you had been there you would swear it does just that.

Finally, the tape could now be raised off the ground to effectuate as near as possible a horizontal line that could never be a straight and level line since the weight of the steel tape always caused a sag. To remove some of the offending sag, tension had to be applied to the ends of the tape. I suppose there were surveyors that employed tension handles in the field that allowed the tension, measured in pounds, to be carefully applied to the tape's length but I have never met the field crew that used them in the field doing a boundary retracement survey. Perhaps a diligent survey firm would have had at least one tension handle in their office in order to show a new employee what 15 to 20 pounds of tension felt like.

For those surveyors that have never seen a tension handle, a close similarity can be visualized by thinking of certain weight scales with a handle at one end and a hook at the other end that are sold to fisherman to weigh the trophy fish they plan to catch. I suspect that some of the survey tension handles that were purchased by surveyors were used more often for weighing fish rather than applying tension on a tape.

With the tape raised off the ground, great skill must now be employed to do several tasks at once. The tape person had to keep the tape level, at a consistent tension, and steady enough to fix a point on the ground using a suspended plumb bob.

The rendition of these tasks in print does not begin to describe the difficulty of combining these tasks in practice. First, the plumb bob string must remain fixed and immovable on a mark found on the tape. This requires one hand be employed to clamp the plumb bob string securely to a mark etched on the steel tape. The other hand is employed pulling on the end of the tape to keep a constant and desired tension. It must be remembered that the steel tape is a smooth ribbon but for some minor roughness caused by marks on the tape surface indicating feet, tenths and hundredths of a foot. The last two mentioned etchings only present at the ends of the tape. The combination of the tension, tape smoothness, and liberal sweat on the hands resulting from the physical labor involve in surveying at the time and the reader can deduce the challenge required in making a measurement while exerting tension on the tape. Usually a leather thong at the end of the tape was used rather than holding the tape itself. A consistent tension was employed by tucking the hand next to the body and leaning the body in the direction away from the other person in order to render the desired tension.

Where a leather thong was not present or 'breaking the tape' required, often as not the tape person would grab hold of the tape and bend the tape down at their hand to afford a better grip – much as a person would do when pulling a rope to get a better grip. This grip often left a 'jog' in the tape at the completion of the measurement. After years of usage, a tape would no longer lay flat but would have rises and dips along its length that would be coupled with a few points of extra thickness where the tape had been repaired.

Let me pause in my rendition of taping to state that when I speak of 'breaking the tape' in this instance, I am not speaking of physically breaking the tape. Rather the phrase was used to indicate the entire length of the tape was not to be employed in making the measurement required.

End of Part I

Boundaries

How the Mason-Dixon Line Settled a Family Feud & Divided a Nation

Book Synopsis Part III: Chapters 7-9

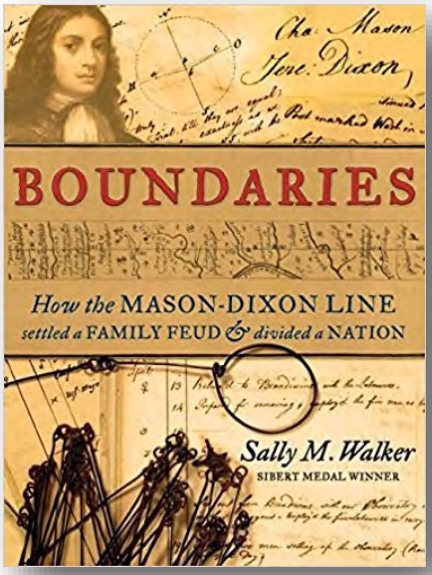
Editor's Note:

This is the third of four installments that presents the entire history of the Mason-Dixon Line through a synopsis of "Boundaries", by Sally Walker.

Today, the Mason-Dixon Line is used to reference the boundary between Southern states and Northern states. This present-day application began during the Civil War. However, the Mason-Dixon Line was actually completed nearly 100 years before the start of the Civil War, and originally served as the boundary line delineating Maryland and Pennsylvania.

The story of the Mason-Dixon Line begins over a century before its completion, in 16th century England. It involves two aristocratic families, the Calverts and the Penns. Across the Atlantic in the New World, the families would find themselves in perhaps the most infamous land dispute in history.

At the time, the Mason-Dixon Line was the largest and most ambitious survey project in history to ever be attempted.



To read previous installments, click below:

Part I - George Calvert founds Maryland and William Penn's Youth
Part II - Escalating Tensions and Introduction to Mason and Dixon

The Surveying Begins

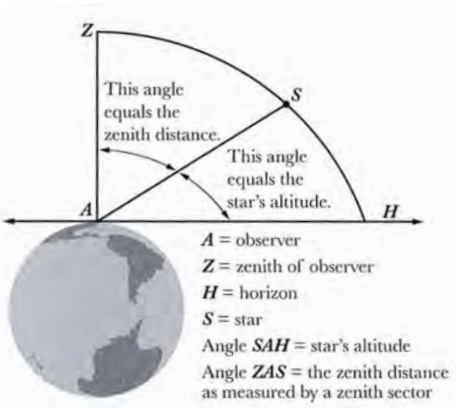
In September of 1763, Charles Mason and Jeremiah Dixon boarded the *Hanover* in London and set sail for the New World. It took them 64 days to reach the shores of the Delaware Bay, and within 24 hours of their arrival, they met with the boundary-line commissioners at the State House in Philadelphia – the building we know today as Independence Hall.

To finally resolve the boundary dispute between Maryland and Pennsylvania, two main lines had to be surveyed. The "West Line" would start on the latitude line that lay 15 miles south of Philadelphia and extend 233 miles west. This line would not actually start directly south of Philadelphia, but rather, lay on the same latitude that was 15 miles south of Philadelphia. The second line, the "Tangent Line", would divide the Delaware peninsula in half.

The first step of the entire process was to determine the latitude of Philadelphia's southernmost point. Then, Mason and Dixon could determine the latitude that lay 15 miles south of that point.

To determine the latitude of Philadelphia's southernmost point, Mason and Dixon utilized a vertical telescope called a zenith sector, which was created by the famous English astronomer John Bird. The instrument was used to calculate the zenith distance, which was the angle created between a star's position in the sky, the observer on earth, and the zenith point in the sky directly above the observer. When this distance was coupled with a star's declination (the celestial equivalent of latitude), one could determine the latitude on the ground.

On January 6, 1764, after two weeks of steady observations, the duo concluded that the latitude of the southernmost point of Philadelphia was 39 degrees 56 minutes 29.1 seconds north (39° 56'29.1" N). Now that this calculation had been made, Mason and Dixon could proceed 15 miles



How the zenith distance is calculated.

The Harlan house, as it appears today.

south and calculate the latitude the West Line would lay on. However, if they went directly south of Philadelphia and began their calculations, they would have to survey across the Delaware River twice, which would be an arduous task.

To avoid the Delaware River, Mason and Dixon traveled 30 miles west of Philadelphia to John Harlan's house. The Harlan house would come to be the duo's home away from home while in America. They would come to know his wife Sarah, and their five children, as if they were family.

After arriving at the Harlan house, the astronomers calculated their latitude once again, to make sure they were *directly* west of Philadelphia's southernmost point. They determined that they were just over 10 seconds south of Philadelphia, a slight discrepancy they would later factor into their calculations.

Mason and Dixon set up their makeshift observatory in the field behind the Harlan house. To permanently mark the celestial meridian line that was needed for accurate surveys, they placed a large rock on the ground. The Harlan family and their neighbors called this rock the "Stargazer's Stone." Today, the Stargazer's Stone still sits north of the historic Harlan house in Pennsylvania, just as it did over 250 years ago.

West Line Latitude and the Tangent Line

To survey on the ground, Mason and Dixon now utilized a tool called a circumferentor, an instrument with a large compass, two leveling bubbles, and two bars for sighting. The zenith sector was now useless, because it was a tool for astronomical measurements.

Measuring distance on the ground was a tedious task. The basic measuring tool was called a Gunter's chain. This chain was 66 feet long, composed of one hundred links that measured 7.92 inches each. It took the length of 80 chains to cover one mile (5,280 feet).

The crewmen would stretch the chain out to maximum length and place a pin in the end ring. Then, they would move forward and repeat the process, beginning at the pin. Occasionally, the links would have to be

The Stargazer's Stone, looking south towards the Harlan house.

morphed back into proper length, because continuous use of the chains would stretch out the links and result in inaccurate measurements if not corrected.

If the surveyors had to measure over uneven ground,

The Stargazer's Stone. The stone wall surrounding it was added in the 20th century.

A satellite image of what used to be the Harlan's property. The top arrow is the Stargazer's Stone, and the bottom arrow is the Harlan house.

they utilized long rods that were 22 feet in length (there were also smaller rods that were 16.5 feet in length). Two two-man crews would carry the rods, and alternate spots, beginning each rod length at the previous rod's end.

On June 9, 1964, Mason and Dixon calculated that the latitude that lay 15 miles south of Philadelphia was 39°43'18.2"N. They marked this latitude with a monument they called "Post Marked West". This is the latitude that the 233-mile West Line – the main border between Maryland and Pennsylvania – would lay on.

Rather than moving ahead with the survey of the West Line, the boundary-line commission instructed Mason and Dixon to survey the Tangent Line. This line, which was 80 miles long and cut the Delaware Peninsula in half, had been attempted to be surveyed by an earlier commission, but repeated failures led to that commission's disbandment.

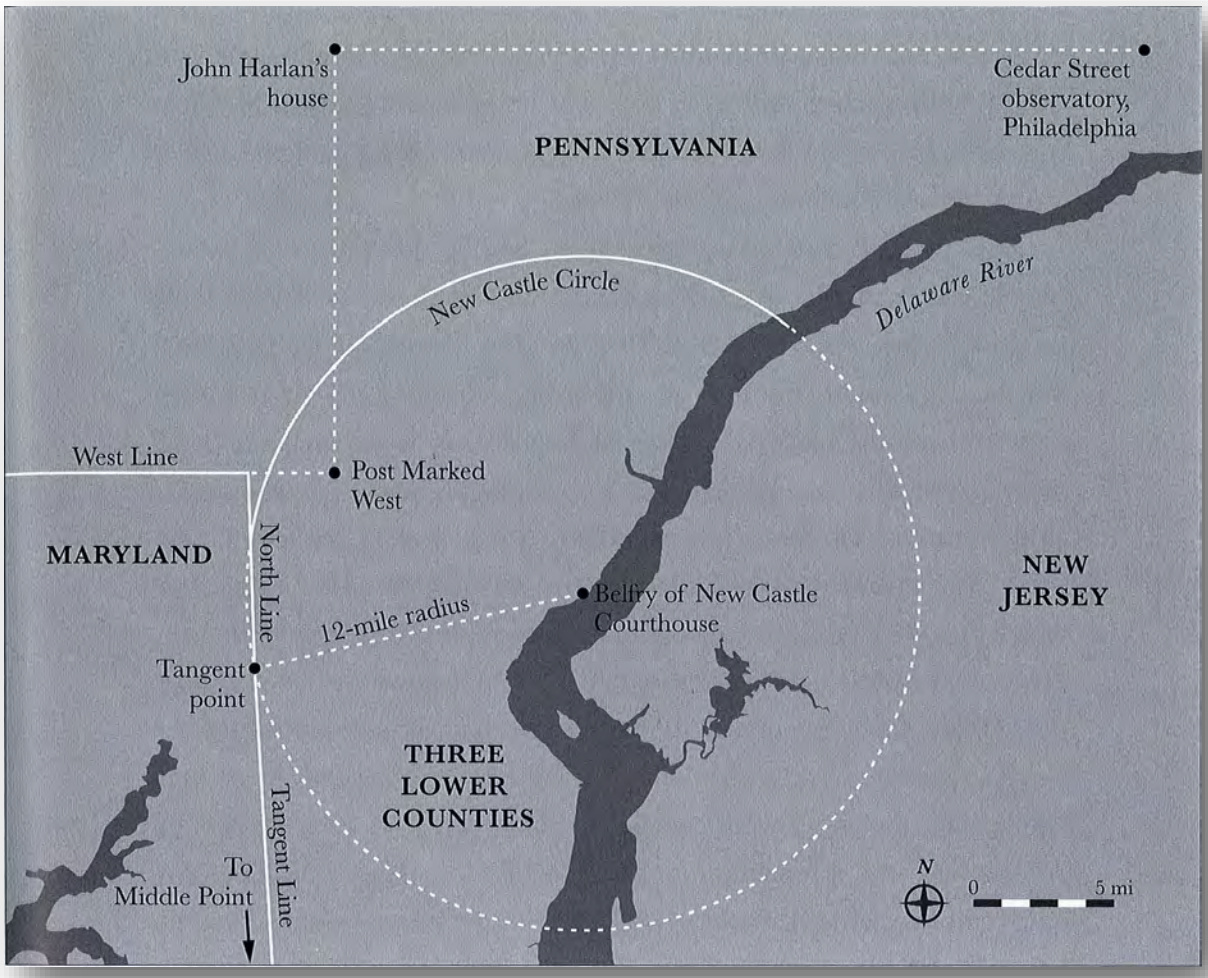
Mason and Dixon's crew now swelled to over 39 people. They hired 26-year-old Moses McLean to act as the manager of the crew. McLean's chief responsibility was to oversee the finances of the entire commission. He purchased food, tents, horses, payed and hired the crewman, and oversaw equipment maintenance and repair.

The previous survey commission of 1760-1763 had attempted to survey the Tangent Line over a three-year period, but to no avail. Their line consistently ended several hundred feet away from the tangent point that had been placed on the 12-mile circle that surrounded the New Castle Courthouse (see illustration).

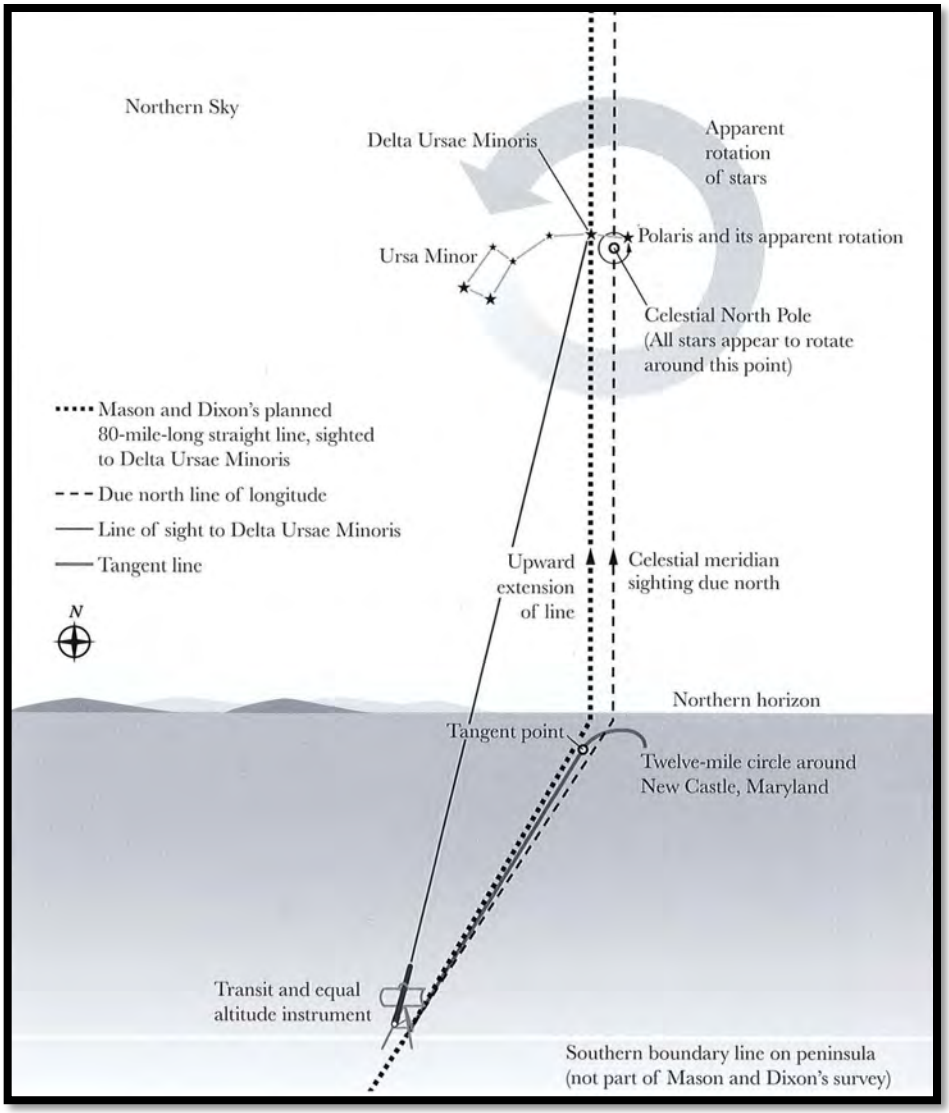
Mason and Dixon decided to survey the 80-mile line using the star Delta Ursae Minor as a guide. Delta Ursae Minor is the second-to-last star of the Ursa Minor constellation, better known as the little dipper (the last star of the constellation is Polaris). This line would end slightly northwest of the tangent point. The duo would then adjust the line southeast using mathematical calculations.

Mason and Dixon traveled south to the Middle Point, the location on the Delaware Peninsula where the 80-mile Tangent Line would begin. Using Delta Ursae Minor as their guide, they slowly progressed over the terrain, using chains and rods to measure the distance. They secured marker posts in the ground every mile to demarcate the trajectory of their line. Finally, after three months of arduous measurements, their line was complete. They calculated that the end of their line lay 1,486 feet northwest of the tangent point.

Now, Mason and Dixon had to shift the line southeast, so it ended on the tangent point. They returned 80 miles south to the Middle Point and began adjusting the marker posts.



A map showing the location of the Harlan house, the North Line, West Line, Tangent Line, tangent point, the 12-mile circle, Post Marked West and the direction to the Middle Point.



A diagram illustrating how Mason and Dixon surveyed the Tangent Line.

Using the location of the tangent point and the end point of their line, they were able to calculate precisely how far to shift their line.

After another grueling two months, the marker posts along the 80-mile line had been readjusted. They then took the angle of their tangent line to the New Castle Circle and rejoiced: the angle measured a perfect 90 degrees, which proved they had successfully run the Tangent Line. Their work now done for the year, Mason and Dixon returned to the Harlan house for Christmas and the winter months.

Boundary Stones and a New Year

When the weather finally cleared in the spring of 1765, Mason and Dixon turned their attention to the West Line. They chose five stars to guide their survey: Vega, Deneb, Sadr, Delta Cygni, and Capella located in the constellations Lyra, Cygnus, and Auriga.

On April 5, Mason and Dixon began surveying at Post Marked West (which marked the latitude the West Line was to lay on) and ran 26 miles of the line until they reached the bank of the Susquehanna river. They then returned east and ran the 5-mile "North Line", which connected the north end of the Tangent Line to the east end of the West Line. Now, the eastern border of Maryland and Pennsylvania was complete.

Mason and Dixon then returned to surveying the West Line. By October, they had run 117 miles of the 233-mile line. They then stopped surveying for the winter months.

But before returning to the Harlan house, the boundary-line commission had another task for Mason and Dixon. They were instructed to place boundary stones along the Tangent Line, to clearly mark the boundary of Maryland and Pennsylvania along the Delaware Peninsula.

The boundary stones, between 3.5 feet and 4.5 feet in length and between 300 and 600 pounds in weight, were shipped from the Isle of Portland in the English Channel. The boundary stones were engraved with the letters P or M on the faces (indicating the Pennsylvania or Maryland sides), or with the Penn or Calvert family Coat of Arms.

The duo then returned to the Harlan house on January 1, 1766, for another wintry season at their home away from home in America.

Menace to GPS - LightSquared/Ligado

FSMS - Geospatial Users Group

Earl Soeder and Allen Nobles

January 2018

Most of us remember the threat that LightSquared posed to GPS users a few years ago and thought it was in the past. It is NOT. LightSquared has now reorganized as "Ligado," and the threat is still real. In the past few months, there have been many emails, articles, and conversations regarding the issue of GPS signals being affected by Ligado. What is most concerning is the fact that through meetings of the Geospatial Users Group and other surveyor-related meetings that users of GPS have no idea of the threat to GPS is still out there or even what Ligado consists of. At a large surveyor's meeting just last week, we heard that there is no threat from this group now. So we want to provide more information to the Users Group and FSMS members about this concern.

To start, we need to explain who Ligado is. If you remember, LightSquared was established by Harbinger Capital (a private hedge fund) after it purchased the distressed company SkyTerra, which possessed a Federal Communications Commission (FCC) license for satellite transmissions. LightSquared was then going to move these frequencies to ground-based systems, with high power transmitters, which would basically overpower our GPS signals.

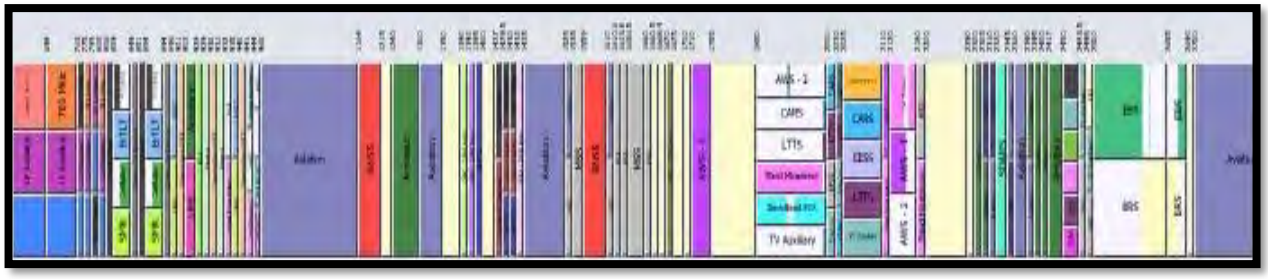
To understand many things, the best place to start is to follow the money. Money is a powerful motivator that can never be underestimated. The money trail brings to light some disturbing issues. At the time of SkyTerra's purchase, the Harbinger Capital hedge fund was under investigation by the Securities and Exchange Commission (SEC) for at least five different matters, including market manipulation, violation of short selling rules, and a questionable $113 million-dollar loan. LightSquared's goal was to provide internet service to the people with their ground-based systems and appeared to have the backing of other groups. The FCC seemed to work with LightSquared, so as a group we can't take for granted that the group will not achieve at least part of its request.

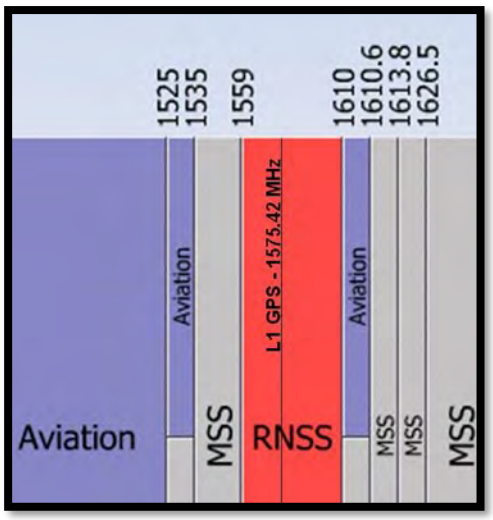
On January 26, 2011, the FCC granted LightSquared a conditional license to install high power transmitters that would broadcast signals much more powerful than, and directly adjacent to, the primary GPS signal. The FCC is charged with managing the frequency allocation of licensees to ensure maximum compatibility, yet they have seemed nonchalant to the obvious impact the LightSquared signals would have to users of GPS. LightSquared transmitters: 1529 – 1559 MHz @ high power, GPS L1 receivers: 1575.42 MHz @ very low power. The FCC has substantially deviated from its standard operating procedures by granting a conditional waiver to LightSquared, in its proposing to provide Fourth Generation (4G) cellular services across the United States. The radio spectrum that has been authorized is directly adjacent to the primary GPS frequency, and the signals to be broadcast will be much more powerful than the GPS signals. Why was the FCC willing to jeopardize such an important service such as GPS and why has LightSquared been put on the fast-track by the FCC to license approval is a question nobody during that administration is willing to answer.

The FCC manages the spectrum of radio frequencies including allocation, licensing and enforcement in the United States and its territories. It was established by the Communications Act of 1934 and is charged with regulating interstate and international communications by radio, television, wire, satellite and cable. The FCC has developed a complex schema for allocating the available frequencies and has tried to ensure that adjacent signals do not interfere with each other (on next page):

Federal Communications Commission Radio Frequency Allocation Table

http://reboot.fcc.gov/spectrumdashboard/searchSpectrum.seam





RNSS Band: 1559 – 1610 MHz

GPS L1 Frequency: 1575.42 MHz

The primary GPS frequency (L1) is broadcast from the satellites and received by ground-based receivers on the frequency 1575.42 MHz which falls within one of the FCC's Radio Navigation Satellite Service (RNSS) bands. The Mobile Satellite Services (MSS) and Aviation band adjacent to the GPS L1 signal have been proven to be compatible with each other over the last thirty years by tens of millions of users worldwide. New broadcasting license applicants to the FCC are normally required to go through an extensive period of review, as well as demonstrating interoperability, before being allowed to deploy their systems. However, on January 26, 2011, the FCC waived its own rules and granted LightSquared a provisional license to install high powered, earth-based transmitters within the 1525 to 1559 MHz range which would drastically interfere with millions of GPS users throughout the United States.

In the Commission's "Waiver Analysis," the FCC stated that the exception was justified by better serving [broadband] public interests. Ironically, the cellular industry which is to be served by the LightSquared product, relies on the very same GPS signals that may be disturbed.

The conditions of the waiver as it relates to the topic of GPS interference include the need for LightSquared to help organize and participate in a working group of industry professionals to analyze the issue and provide recommendations for near-term and operational measures that can be taken to reduce the risk of interference. A final report was submitted by LightSquared to the FCC on June 15, 2011 including the working group's analyses and specific recommendations going forward to mitigate potential interference to GPS devices.

Testing conducted by the GPS manufacturer Garmin concluded that their current consumer grade receivers experience significant jamming within a radius of several miles from a simulated LightSquared transmitter and had a complete loss of lock at a simulated distance of 0.66 miles from the transmitter. A GNS-430W Aviation certified GPS receiver began to be jammed at 13.8 miles from the simulated LightSquared transmitter and experienced complete loss of lock at 5.6 miles.

The GPS industry is being represented on the FCC-mandated "GPS Interference Working Group" by the United Stated GPS Industry Council (USGIC). After conducting tests with actual LightSquared generated signals at Holloman Air Force Base, the State of New Mexico's E911 program director stated that the tests "substantiate concerns that the LightSquared network will cause interference to GPS signals and jeopardize 911 and public safety nationwide." Eyewitnesses reported that during the testing process, some equipment was limited to 7 visible satellites at any location. Upon moving 50 yards from their position at the test site towards the tower, visibility was diminished to 3 or 4 satellites, and at 60 yards, they were unable to establish any satellite connections.

At the time of the testing, LightSquared had already signed deals with SI Wireless, Cellular South, Leap Wireless, and Best Buy. GPS and the effects they would have did not even seem to be on the docket for LightSquared. When asked

by Cecelia Kang of the Washington Post about launch dates and the concerns surrounding GPS, LightSquared CEO, Sanjiv Ahuja, answered "We are on track. And we expect to reach over 100 million pops next year and 92 percent of the population by 2015."

Verizon, T-Mobile, and AT&T had to spend millions of dollars each and spend much more time obtaining their licenses for cellular transmissions. LightSquared was grandfathered into their license through the purchase of SkyTerra and approval from the FCC. The usual FCC process is to conduct extensive testing prior to approvals. For LightSquared, the process was approved first, then tested, as stated previously.

The test determined the effects were real, they were conclusive, and they shut down GPS as we know it. Through a large push by the GPS industry (including manufacturers and agriculture) and governing agencies, LightSquared was told to go back to the drawing board, and present an alternative solution. Since LightSquared's motive was the 10 million dollars profit, they did not present a true technical alternative solution. FCC did not confirm LightSquared's modified request, and in 2012, the company went into bankruptcy, to which many assumed it was gone. However, several people kept engaged in this issue knew the money was too great, and it could resurface again. Reorganizing and emerging as Ligado in December 2015, it continued to pursue repurposing of its spectrum by sponsoring tests by Roberson and Associates, and tests at the National Institute of Standards and Technology (NIST)/National Advanced Spectrum and Communications Test Network (NASCTN) to establish test procedures. Both groups of tests were carefully reviewed by the National Space-Based Positioning, Navigation and Timing Advisory Board (PNTAB) who found serious flaws. In general, Ligado rejected the 1-dB criterion and did not accept the need to protect all classes of users, particularly high-precision receivers. In addition, it did not consider the new GPS L1 signals (L1C and L1M), nor did it check the impacts on the international GNSS. The PNTAB assembled a 14-point summary of deficiencies and requested updates and corrections for the flaws.

NASCTN'S response did not really address the points, or either claimed that there were no funds to correct the problems. The PNTAB then developed a **Six-Point Criteria** for acceptable interference testing, summarized as:

- Accept and strictly apply the 1-dB criterion.
- Verify interference for all classes of receivers.
- Test and verify for all operating modes.
- Focus analysis on worst cases.
- Include the new GNSS signals.
- Include GNSS expertise and openly publish results.

Both Ligado test sets clearly failed on all six points.

While the Ligado-sponsored tests were neither independent nor adequate, the United States Department of Transportation (DOT), led by Karen VanDyke, sponsored a very complete set of independent tests; these are the most credible estimates of harmful interference. The test results have been made public. The PNTAB's six points were published after DOT testing had begun, but DOT expanded and modified their effort to satisfy the criteria. The DOT conclusions, based on modeling real-world antennas and propagation patterns, are shown in **Table 1**.

Standoff Distance	General Location/ Navigation	High-Performance Receivers	Timing Receivers	Cell Phones
10 Meters	0.8 milliwatts (P2 is 197,900 times too large)	64 microwatts (P2 is 24,687,500 times too large)	8.7 milliwatts (P2 is 181,609 times too large)	12.3 Watts (P2 is 128 times too large)
100 Meters	79.4 milliwatts (P2 is 19,899 times too large)	6.5 milliwatts (P2 is 243,077 times too large)	0.9 Watts (P2 is 1756 times too large)	1.2 kilowatts (P2 is 1.25 times too large)

TABLE 1. DOT ABC test results. Maximum tolerable effective radiated power (EIRP) for classes of the most susceptible GPS receivers for modified Ligado proposal (P2) of 1.58 kilowatts. In red are the factors that Ligado P2 exceeds the maximum tolerable radiated power. At 100 meters, all classes of receivers tested had results that would exceed the 1-dB threshold, even for the reduced power level (P2, 1580 Watts) which has been the most recent filing. The shaded square is particularly troublesome. It shows that, for the most susceptible high-precision receivers, the Ligado proposed power exceeds the 1-dB threshold by over 200,000. This result is particularly damning for the proposed repurposing, because it is this class that produced the highest payoff in the recent Department of Commerce Study — over $30 billion per year.

This ongoing discussion on the effects have resulted in continued meetings through other groups such as the Radio Technical Commission for Maritime Services (RTCM). RTCM held a joint meeting in May 12, 2017 in Clearwater, Florida representing special committee SC104, along with special committee SC131 representing Ligado, to discuss the issue of interference of GPS signals and to see if SC131 had any alternative solutions. The meeting was organized by Kate Duffy, RTCM President and chaired by Ross Norsworthy.

RTCM is voluntarily obligated to the International Maritime Organization (IMO) to provide a Committee Draft (CD) to the International Electrotechnical Commission (IEC) by the end of July 2017. SC131 has a preliminary draft CD that includes a draft adjacent band interference mask for the RNSS band 1559 MHz to 1610
MHz. SC131 constituents have the opinion that it is premature for SC131 to finalize the proposed adjacent band interference mask.

The heart of the controversy is the outstanding Notice of Proposed Rule Making (NPRM) by the FCC to license the use of an adjacent band to the RNSS band 1559 to 1610 MHZ for use as a cellular telephony service; it is being opposed by a significant portion of SC131's constituency. DOT has been conducting tests to determine the consequences of the NPRM on the installed GPS infrastructure in the U.S. Some test results have been published, but the issues have not been resolved. Consequently, SC131 currently has a conflict of interest between its tasking and its constituency.

Therefore, SC131 is considering an alternative approach that would fully utilize all of the available resources. This multi-band/multi-system approach would provide superior resilience to interference (both in-band and adjacent band) and spoofing. (L1 has been the primary consideration. Norsworthy believes L2 and L5 and other satellite systems should be used.)

The meeting ended with SC131 getting up and leaving the meeting, citing the issue is not its concern. As we stated, this issue will not go away since there is a lot of money involved by investors.

In December 2017, Phil Falcone's Harbinger Capital is seeking $2 billion in damages for "massive fraud" alleging that Apollo Global Management and others sold it on a plan to launch a terrestrial broadband network while concealing test results showing the network would cause crippling GPS interference and was unlikely to be approved. Assertions in the lawsuit about those tests, the impact of the interference to GPS, and an indirect admission about the difficulty of meeting the standards normally used to assess GPS interference may have implications for Ligado Networks, the current holder of the frequencies.

On January 16th, 2018, GPS World published an article about how the war rages on regarding the signals and the threat to any device using precision GPS, including public safety vehicles, aviation, precise machine control and agriculture, and the newest category, UAVs. The results to UAVs are dramatic since they are unmanned and need to have precise positioning.

As the Geospatial Users Group continues to hold meetings around the state, we will continue to update members, and attendees of our meetings, of any decisions or outcomes of this threat.

Respectfully Submitted,

Geospatial Users Group

Earl Soeder, Allen Nobles & Richard Allen

Sources:

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FSMS Pioneers

A series that honors the legends of surveying in the state of Florida

By Dominic Levings

Oscar Pittman

After a career that began six decades ago, Pittman has cemented his legacy in Florida

The Early Years

The world was a lot different in 1961 than it was today. Fifty-seven years ago, the Compact Cassette tape had not yet been invented. John F. Kennedy was the President of the United States. Only 5 million people lived in Florida, and nobody had any clue what "Star Wars" was. One thing, however, is not different: and that is Florida License Survey Number 1748, which belongs to Oscar Pittman of Pensacola, Florida.

To say that Pittman had a distinguished career would be an understatement. His career in the profession spanned a remarkable 55 years. Over that period, he founded his own company, taught classes for 15 years, and served on the Florida Board of Professional Surveyors and Mappers, to name but a few of his accomplishments.

But what is surely most indicative of his success is the legacy he has left behind. His name has become synonymous with surveying greatness in Pensacola, and his surveying tree has so many branches, it is perhaps unrivaled anywhere else in Florida.

Pittman, 82, was born on November 2nd, 1935 in Marianna, Florida, the second youngest of six children, and the only boy. He grew up on an 80-acre farm with his sisters and his parents, Gussy and Daniel.

"You never run out of work on a farm," Pittman said of his early years in Marianna. "You never catch up. That's just not gonna happen. Especially when you have hogs, cows, and chickens, and have to raise crops, too. It's a steady thing."

After graduating high school in 1953 at the age of 17, Pittman moved to Pensacola seeking employment. He moved in with one of his sisters and her family while he searched for a job. He worked a few odd jobs here and there, including a stint at a local grocery store, before he landed a job installing a sprinkler system at the nearby Naval Air Station.

It was the requirements of this job that eventually led Pittman into the surveying profession. He was able to decipher the complicated layout plans for the piping network of the sprinkler system. He was retained by the company and aided in interpreting layouts, charts, and instructions.

Soon after, he went to work for the county surveyor, and started as a crewman in the field. In 1961, he became a licensed surveyor after passing the official exam. He also obtained licenses in Alabama, Mississippi, and Georgia.

Pittman says his love for property, nature, and the outdoors is the primary reason he fell in love with surveying, a result of his youth spent on the family farm. He also cites the lack of monotony involved with the profession.

Oscar Pittman, Harley Gilmore, and Fred Duell at the 50th annual FSMS Conference in 2005.

"I've always been enamored by property. I just enjoy property and always have. I like to be out on the ground – you do something different every day. No two jobs in surveying are alike. Not to me, at least," Pittman explained.

Running section lines has always been his favorite type of survey. While he admits it is not the most profitable work, he relishes the challenge in trying to prove corners and find original monument markers.

"It's like being a detective, really," Pittman said.

Pittman recalled one survey in which he found three out of four witness trees from a survey originally conducted in the 1800s. He was also able to locate the original corner post, marked by a stone monument, which was a ballast stone from a 19th-century ship.

Pittman & Associates

In 1975, Pittman founded Pittman & Associates in Pensacola. He ran the company for 25 years, forging it into the premiere surveying firm of the Panhandle area. In 2000, he sold the firm to longtime employee David Glaze, who still owns Pittman, Glaze & Associates today.

Glaze remembers the first time he met Pittman, during an interview for a job. In the interview, Pittman asked Glaze how to calculate some coordinates by hand, but he didn't know how. Then, right in the interview, Pittman took the time to teach him how to do it.

"How many people will do something like that?" Glaze said. "Even in the first job interview, I learned something from him."

What Glaze admires most about his former boss, however, is his leadership style and personality.

"He was many things. He was a great teacher. He was a hard taskmaster. He expected you to do your job and do it well and not screw around," Glaze said.

"But he was a very ethical man. Oscar was probably the most ethical man I've ever met in my life. And I learned a tremendous amount from just staying after work and discussing surveying with him."

Another likeable aspect of Pittman, Glaze added, is that he is an "extreme joke teller". He recalled that one year at an FSMS conference, Pittman was under a gazebo outside the hotel, rattling off one joke after another to a small crowd. During the impromptu performance, one attendee, who didn't know Pittman, said that he was glad that FSMS had hired someone to entertain at the conference.

Ronald Ruben worked for Pittman from 1986 through 1989. He interviewed for a job with Pittman when he was only 19 (while humorously wearing a three-piece suit). Today, Ruben owns Ruben Surveying & Mapping in Gulf Breeze, Florida, which he started in 1998.

"I love Oscar. He's the reason why I am where I am today and I make the money that I make. I truly attribute it to him having selected me for the profession. I had no idea at 19 that it'd be the only job I'd ever have," Ruben said.

Ruben worked with Glaze and Glaze's younger brother, Jay, during the "golden years" of Pittman & Associates. They all worked on the same crew – David was the crew chief, and Jay and Ruben were the rodman and instrument man.

Like Glaze, Ruben admired Pittman's style as a boss and attributes his own success as a business owner to the lessons he learned from him.

"He had the patience of Jobe. He was calm, he was kind. He was not

Surveying vans lined up in the lot behind Pittman & Associates, circa 1999.

an [expletive]. You know what I mean?" Ruben explained.

"He was all the things that I aspired to be [as a boss]. His personality allowed him to be a great boss. He was fair, he understood. His checks were always on time. He's a good church-going, god-fearing, family man."

On Changes in the Profession and Teaching

Consistent involvement in surveying over a 57-year period has allowed Pittman to observe and analyze changes in the profession. He laments how technology has replaced some of the meat-and-bones fundamentals of surveying, which were a staple in his heyday.

In his first job surveying with the county, the crew utilized transits and levels, which are antiquated today, and an individual had to start out at the bottom of the totem pole on the field crew. You would then move your way up on the crew as you gained experience.

"What's got me concerned is that most firms now are running two-man crews. When I first started, you began as a tail chainman, then head chainman, then instrument man, then party chief. Now, when you're hired, there's no learning process. There's no ladder," Pittman said.

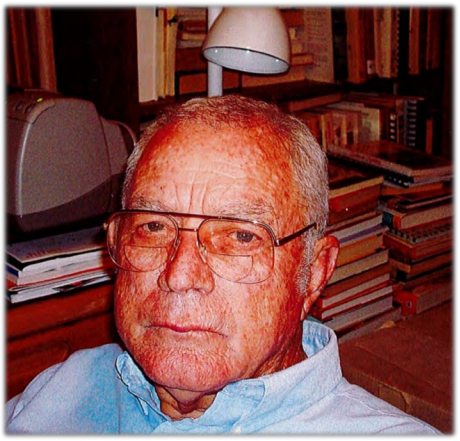
"A lot of guys now are data collectors, and they turn angles and distances and bring it to the office and someone with AutoCAD will plot it out and make the decision. People aren't getting the experience to be licensed surveyors. How do you find people, how do you train people? How do you get people interested in surveying anymore?"

While he acknowledges that the increased use of technology in the profession is inevitable, Pittman believes that individuals should still be taught the *what* and *why* of the technology in order to fully grasp the role of a surveyor.

Oscar and his wife Lou (left) with Buddy and Sharon Bannerman at the Renaissance Hotel in Orlando in 2006. Bannerman was the FSMS President in 1983-1984.

After selling Pittman & Associates in 2000, Pittman was not quite done contributing to the profession. After a professor at Pensacola State College left in the middle of the semester, the administration contacted him and asked if he would finish teaching the "Construction Surveying" course as an adjunct professor. The rest is history, as Pittman taught for another 15 years; for two of those years, he also taught a class at the University of West Florida.

Like many teachers who truly enjoy their job, Pittman's interaction with his students was what he valued most.



The gaze of a seasoned surveyor.

"If you've got students who want to learn, it makes all the difference in the world. You just enjoy teaching somebody who wants to learn. If you've got someone who could care less, it takes all the fun out of it," Pittman said.

"It was just something I enjoyed doing. I enjoyed meeting the people. And it was interesting to see how some of the students think."

Family

Pittman and his wife, Lou, have been married for 62 years.

"Best wife I ever had," Pittman joked. "I'm surprised she hasn't killed me. She hasn't even attempted so far – that I know of."

The events of their wedding day sound like something suited for a dark comedy. On the way to the wedding, Pittman got into a car wreck. The driver who slammed into him was drunk and was taken to jail, and Pittman's car had to be towed. He had to hitch a ride to the wedding.

But the misfortune didn't stop there. Their preacher, who was to marry them, had had a heart attack earlier in the day and was in the hospital. Fortunately, another preacher of the church was a guest of their wedding and agreed to preside over the ceremony.

Some of Pittman's friends didn't think the marriage would last. They said that "Oscar was too wild" – something he doesn't disagree with. In fact, Pittman will be the first to tell you that he used to "run the streets".

"When you're young, you're running the streets. Only two things are important to you, a car and your clothes. You won't have anything else cause you're broke all the time. Dating and the car were expensive. You weren't making much money," Pittman said.

But of course, after 62 years of marriage, Pittman has proved his doubters wrong. He and Lou have one son, Craig Pittman, and two grandsons. Craig has been an environmental reporter for the Tampa Bay Times since 1998. He has also authored four books, all of which are nonfiction and revolve around events in Florida. His most recent book, *Oh, Florida!*, was published in 2016 and named a *New York Times* bestseller.

Retirement and Reflection

After retiring from teaching in 2015, Pittman found himself with no work-related obligations for the first time in over 60 years.

"Once I retired, I found out I got six Saturdays and one Sunday every week. I highly recommend it," he joked.

He is still a member of FSMS and has attended a phenomenal 57 straight FSMS conferences. He attended his first conference in 1961 – the year he became a licensed surveyor – and hasn't missed one since.

"You meet a lot of people at the conference. You learn. Your local competitors won't help you out, because you're competitors. But if you're out of town at the conference, everyone figures hey, they're not my competition, so I don't care. You share a lot of things, how you do indexing, how you bill, what have you learned about this, etc.," he said.

Oscar now has a lot more time for fishing.

When asked what he remembers most fondly about his time in the profession, Pittman wasted no time in answering.

"You know, I just enjoyed doing what I did. I enjoyed the people. I had clients that were with me for quite a number of years. That always made me feel good, that you had people that were always your client and didn't go to anyone else," Pittman said.

It appears that his clients had good reason to stick with him. Glaze says that Pittman's reputation was the sole reason he didn't start his own company, and that his stature as a leader and teacher resonate throughout Pensacola.

"That was a no-brainer. That was the whole reason for buying his company instead of starting my own, was the name recognition and the reputation he had," Glaze said. "I tried for two years to get on with him because he was the best and he had that reputation. I actually took a pay cut to go and work for him."

"He's trained a lot of the surveyors here locally. I'd say half the surveyors here locally have worked for him. The quality of surveyors around town…the ones that were trained by Oscar, have the best reputation."

Ruben also cited Pittman's reputation as evidence of his success. His prestige is so great, that employees of Ruben Surveying & Mapping have a nickname for Pittman's corner monuments.

"He's respected in the Panhandle and throughout the state. When we come across a Pittman 1748 at Ruben Surveying, we call it a 'godrod'. That sucker is gold, baby," Ruben exclaimed.

Recently, Pittman began taking a class at a local Methodist church. The class is about writing your life story – whether it be for your kids, your grandkids, and quite possibly, someone you'll never know.

The class has given Pittman reason to reflect back on his own life, and has also invoked in him a tinge of regret.

"There's a lot of questions now I wish I would've asked my mom before she passed. I would like to know how her and my dad got together, what their life was like when they were young, how they met, that sort of thing," he said.

Although Pittman may have questions about the lives of his parents that will never be answered, there is little question that future readers of his yet-finished life story will be reading the words of a surveyor who belongs among the ranks of Florida's greatest.

Family Photos

The Vera clan celebrating Manny Vera, Sr.'s 80th birthday aboard a cruise.

Manny Vera, Jr. and his family on winter vacation in Vail, Colorado.

Steve Brickley and his daughter, Hannah, on a ride at LegoLand. Despite the look on her face in this picture, she made Steve go on the ride two more times!

Josue Tirado - whose main hobby is aviation - in front of a plane he took on a test flight.

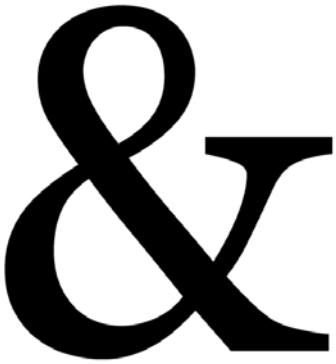
A vintage surveying photo: Holly Collom's uncle by marriage, Ken Waldref, is seen off to the left side.

Robert Waldref, Holly's brother-in-law, is seated in the truck. Ken Palmer is manning the instrument. The Waldrefs worked for Smally, Wellford, & Nalven.

Did you Ever WONDER Why?

Michael Whitling, PSM

Why do we use the "&" symbol to mean "and?"
The "&" today is used primarily in business names, but that small character was once the 27th part of the alphabet. We know the "&" as an "ampersand" but the character "&" has been around for more than 1500 years before the word for it. In the first century, Roman scribes wrote in cursive, so when they wrote the Latin word *et,* which means "and", they linked the e and t and created the "&" symbol. The word "ampersand" came many years later when "&" was actually part of the English alphabet. In the early 1800s, school children reciting their ABCs concluded the alphabet with the "&." It would have been confusing to say "X, Y, Z, and." Rather, the students said, "and per se and." "Per se" means "by itself," so the students were essentially saying, "X, Y, Z, and by itself "and." Over time, "and per se and" was slurred together into the word we use today: ampersand.



Why when we say someone with a mean disposition is "ornery?"
"Ornery" is a contraction of the word "ordinary". It was used a long time ago in America to denote that something was of low value (being ordinary, rather than special). "Ornery" eventually evolved to describe people as ill-tempered or mean.

Why are dried grapes called "raisins?
"Raisin" meaning dried sweet grapes comes from the 13th century Old French word *raycin*, which comes from an alteration of the Latin word for a cluster of grapes or berries, *racemus*. Until medieval times, raisins were the second in choice as a sweetener, honey being the top choice. At one time in ancient Rome, raisins were considered so valuable that two jars could buy a slave. In the 13th century, Damascus had quite a reputation for their sweet raisins. In 1873, California suffered a devastating drought which literally dried the grapes on the vine. Looking to recoup some of the grape crop, an enterprising marketer in San Francisco sold the dried and shriveled grapes as "Peruvian Delicacies," and the California raisin industry was off and running. Now the majority of the world's supply of raisins comes from California, dried from Thompson seedless (95 percent), muscadine, or Black Corinth (Zante) grapes. Once sun-dried, a process taking two to four weeks, they are then graded, cleaned, and packed. Some raisins are kept golden in color by the use of sulfur dioxide (sulfites).

Why is anyone who is considered a novice or not skilled in some area called a "bush leaguer?"
So why bush? This arose, first in Australia, from Dutch bosch "wood(s)", and first appears in English in the late 18th century, referring to woods but also, and then later more exclusively, to uncleared, untamed lands, especially in the interior. It also came to mean "country" versus "city". By extension, bush came to refer, by the middle of the 19th century, to anything crude or roughly made, or a person practicing a craft for which he had received no formal training, like a "bush carpenter". That sense was picked up in America and applied to the minor baseball leagues, which often played in small towns and were not as skilful as the major league players. "Bush league" is first recorded in that sense in 1906, as is "bush leaguer." By 1943 it was being used beyond baseball in America. As in "an engineer trying to do surveying is so bush league!"

Quick Facts:

⇒You'll never hear one from me, but studies show that approximately 0.5%-0.7% of all spoken words are swear words. This rate is only slightly less than the rate that English speakers say "we," "us," and "our."

⇒In Medieval times, girls ate unusual foods on St. Valentine's Day to make them dream of their future husband.

⇒Hitler and Napoleon both had only one testicle.

⇒Every time Beethoven sat down to write music, he poured ice water over his head.

⇒During the chariot scene in the movie Ben-Hur, a small red car can be seen in the distance.

⇒The longest chapter in the Bible is Psalms 119.

⇒The only fifteen-letter word that can be spelled without repeating a letter is uncopyrightable.

⇒The avocado has the most calories of any fruit.

⇒Luke Skywalker's last name was changed at the last minute from Starkiller to make it less violent

⇒The Lone Ranger's sidekick's name, Tonto, means "moron/fool/stupid" in Spanish. As a result, in the dubbed Spanish version, the character's name is change to "Toro," meaning "bull."

⇒Pineapples do not ripen after they have been picked.

⇒A can of SPAM is opened every four seconds.

⇒Ever wondered what the symbols used instead of spelling out a swear word explicitly, as in "!*@#", are named? In this context, the symbols are known as "grawlixes."

⇒The Italian city of Verona, where Shakespeare's lovers Romeo and Juliet lived, receives about 1,000 letters addressed to Juliet every Valentine's Day.

⇒The phrase "the boogeyman will get you" refers to the Boogey people who still inhabit an area of Indonesia. These people still act as pirates today and attack passing ships.

⇒The glue on Israeli postage stamps is certified kosher.

⇒The estimated number of M&Ms sold each day in the United States is two hundred million.

⇒Each year, Americans spend more on cat food than on baby food.

Send your thoughts drmjw@aol.com

From the Archives

Mr. W. R. Bandy
921 Monroe Avenue
Helena, Montana 59601

April 6, 1972

Dear Roy:

First let me apologize for the unwarranted delay in replying to yours of February 13, which included the wonderful reproduction of the painting, "Breakfast of the Big Horns".

From April 1972: A painting of a survey crew near the Big Horn Mountains in northern Wyoming in 1912. In 1972, former FSMS President James A. Thigpenn III was in correspondence with William Roy Bandy, a surveyor in Montana. Bandy was sending Thigpenn letters that detailed his life story, and included this painting of the campsite. Bandy is second from the left in the painting; behind him is his brother, Willis, and the woman is Bandy's wife, Inez. The other two men are unidentified crewmen.

Around the State

Indian River Chapter 2018 Charity Clay Shoot

March 3, 2018

Team Application
Sponsorship Opportunities

Former FSMS Presidents Bob Jackson (2007-2008) and Lou Campanile, Jr. (2016-2017) ran into each other in Fort Lauderdale.

Aren't you glad you don't live in New Hampshire? *(From The TBM, published by the NHLSA).*

President Bob Strayer and his chili cook team had a busy January.

Left: On January 23rd, the team took home first in presentation, first in most unique chili, and best overall at the Venice Board of Realtors Annual Scholarship Chili cook-off.

Right: The following weekend, the team took home first place at the Harley-Davidson Chili cook-off in Port Charlotte. The team won both contests with their signature white chili.

IN MEMORIAM

Edward J. McDonald

March 11, 1936 - January 25, 2018

Edward J. McDonald, 81, passed away in Punta Gorda on January 25, 2018. He was born in New Kensington, PA. on March 11, 1936.

Ed was the County Surveyor for Charlotte County for 20 years. He is survived by his loving wife of 58 years, Marilyn, as well as four children: Jack McDonald (Karen), of Kailua, Hawaii; Mike McDonald (Noemi), of Fort Myers, FL.; Carol Buchanan (Bobby), of Homestead, FL,; and Peggy Herlihy (Jim), of Beech Island, SC.

In lieu of flowers, the family requests donations be sent to the American Heart Association.

IN MEMORIAM

Kenneth J. Monie

October 4, 1949 - January 1, 2018

Kenneth J. Monie of Gulf Breeze, passed away on January 1, 2018.

Kenny was born in Jay, Florida to Joseph Stewart Monie and Dora Shipp Monie. The family relocated to Cantonment, Florida where Kenny was raised. He began high school at J. M. Tate High however, his family again relocated, this time to Camden, South Carolina, where Kenny graduated from Camden County High School.

Kenny began his surveying career working for Baskerville-Donovan Incorporated and other companies in Pensacola. He then went to work offshore, surveying for oil companies. In 1993, with a young family, he decided to return to land and open his own company, KJM Surveying, with his wife of 30 years only to be separated by her death, in 2012. Kenny's life on this earth ended while he was the principal officer at KJM Land Planning in Pensacola Florida. He was a Florida licensed surveyor and mapper for over 30 years. He was an integral part of the development community in the panhandle.

During his career he provided expert surveying services to countless clients.He also helped many young men and women with their goals and careers in the surveying world and in the game of life. He offered sound advice to those willing to learn and ask for help. Kenny was truly a generous giving man who always tried to help people in all situations.

Kenny spent many holidays and vacations with family in Georgia. There they would ride four wheelers in the woods and on trails for hours on end. He loved riding and would say to his brother Roy on numerous occasions, "Let's go, we're burning daylight". Kenny truly enjoyed the outdoors hence his choosing a surveyor's life; an outdoor profession for an outdoors guy.

Survivors include: His loving sons Daniel and Alex, brothers Gary Monie (Helen) and Roy Monie (Jonnie), sisters Myrtle Portier and Sharon Crutchfield, and many nieces and nephews. He was also loved dearly by his "adoptive" granddaughters Kennedy and Margaret Gordon and grandson Steven Davis.

Published in the Pensacola News Journal on Jan. 5, 2018.

Florida Surveying and Mapping Society

2017 eLearning Courses

Basics of Real Property Course #8360 (3 General CEC)

$ 70.00

Boundaries in Florida Course #8255 (6 SOP/L&R CEC)

$ 120.00

Contracts for the Professional Course #8412 (3 General CEC)

$ 70.00

Elevation Certificates and the Community Rating System Course #8256 (3 General CEC)

$ 70.00

Ethics for the Design Professional Course #8621 (6 General CEC)

$ 120.00

Florida Laws Course #7149 (6 SOP/L&R CEC)

$ 120.00

Professional Ethics and Professional Courtesy FULL Video Course #8363 (6 General CEC)

$ 120.00

Georgia Technical Standards for Property Surveys Course #8554 (6 General CEC)

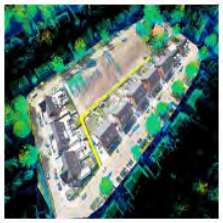
$ 120.00

History of Surveying Course #7140 (6 General CEC)

$ 120.00

Identification of Native and Non-Native Trees in Florida Course #8132 (6 General CEC)

$ 120.00



Introduction to Photogrammetry Course #7968 (3 General CEC)

$ 70.00

Land Tenure and Cadastral Systems Course #8260 (6 General CEC)

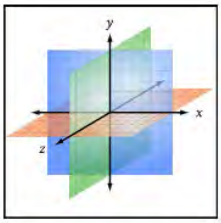
$ 120.00

Map Projections and Plane Coordinate Systems Course #8261 (6 General CEC)

$ 120.00

Mean High Water Observations & Computations Course #8262 (6 General CEC)

$ 120.00

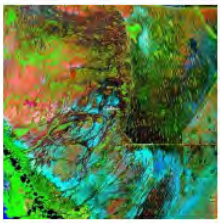


Practical Geometry for Surveyors Course #7141 (6 General CEC)

$ 120.00

Public Land Survey System Course #7147 (6 General CEC)

$ 120.00



Remote Sensing Applications to Surveying & Mapping Course #7148 (6 General CEC)

$ 120.00

Writing Boundary Descriptions Course #8362 (3 General CEC)

$ 70.00

Correspondence Courses

Step 1: Choose Course(s)

☐ **5J-17 Standards of Practice (SOP)**, #6962, 6 SOP/L&R CEC

☐ **A History of the Prime Meridian Marker**, #8403, 3 General CEC

☐ **Basics of Real Property**, #8359, 3 General CEC

☐ **Boundaries in Florida**, #7667, 6 SOP/L&R CEC

☐ **Chapter 177, Platting (Plat Law)**, #6970, 6 SOP/L&R CEC

☐ **Client Satisfaction Excellence for Surveying and Mapping Professionals**, #7229, 6 General CEC (*Only available by mail)*

☐ **Contracts for the Professional**, #8411, 3 General CEC

☐ **Critical Communication for Surveying & Mapping Professionals**, #7228, 6 General CEC (*Only available by mail)*

☐ **Digital Signatures for Surveyors**, #8491, 3 General CEC

☐ **Elevation Certificates and the Community Rating System**, #8257, 3 General CEC

☐ **Ethics for the Design Professional**, #8620, 6 General CEC

☐ **Florida Laws**, #6966, 6 SOP/L&R CEC

☐ **Georgia Technical Standards for Property Surveys,** #8553, 6 General CEC

☐ **Geographic Information Systems (GIS)**, #7107, 6 General CEC

☐ **History of Surveying**, #7108, 6 General CEC

☐ **Identification of Native and Non-Native Trees in Florida**, #7874, 6 General CEC

☐ **Introduction to Photogrammetry**, #7887, 3 General CEC

☐ **Land Tenure and Cadastral Systems**, #7829, 6 General CEC

☐ **Map Projections and Plane Coordinate Systems**, #7669, 6 General CEC

☐ **Mean High Water Observations and Computations**, #8220, 6 General CEC

☐ **Practical Geometry for Surveyors**, #7109, 6 General CEC

☐ **Public Land Survey System**, #6979, 6 General CEC

☐ **Remote Sensing Applications to Surveying & Mapping**, #6972, 6 General CEC

☐ **Stress Management for Surveyors & Mappers: How to be Productive Under Pressure**, #6902, 6 General CEC (*Only available by mail)*

☐ **Time Management for Surveyors & Mappers: How to be Productive & Exercise Time Mastery in A Hectic World**, #6901, 6 General CEC (*Only available by mail)*

☐ **Writing Boundary Descriptions**, #8361, 3 General CEC

Correspondence Courses Order Form

Step 2: Choose Member Type

☐ **FSMS Member**

EMAILED			**Quantity**		
6 CEC	$115 Per Course	x	_____	=	$ _____
3 CEC	$58 Per Course	x	_____	=	$ _____
MAILED					
6 CEC	$125 Per Course	x	_____	=	$ _____
3 CEC	$68 Per Course	x	_____	=	$ _____
	TOTAL		_____		$ _____

☐ **Non-Member**

EMAILED	**Fee**		**Quantity**		**Amount**
6 CEC	$135 Per Course	x	_____	=	$ _____
3 CEC	$78 Per Course	x	_____	=	$ _____
MAILED					
6 CEC	$145 Per Course	x	_____	=	$ _____
3 CEC	$88 Per Course	x	_____	=	$ _____
	TOTAL		_____		$ _____

☐ **Non-Licensed in ANY State**

EMAILED	**Fee**		**Quantity**		**Amount**
6 CEC	$100 Per Course	x	_____	=	$ _____
3 CEC	$60 Per Course	x	_____	=	$ _____
MAILED					
6 CEC	$110 Per Course	x	_____	=	$ _____
3 CEC	$70 Per Course	x	_____	=	$ _____
	TOTAL		_____		$ _____

Step 3: Payment Information

Name: _____ PSM#: _____ State: ____ FSMS Member: ___ YES ___ NO

Firm: _____ Sustaining Firm: ___ YES ___ NO

Address: _____

City/State: _____ Zip Code: _____

Email Address: _____ Work Phone: _____

Payment Information: _____ Check Enclosed (Payable to FSMS) _____ VISA/MasterCard/American Express

Card #: _____ Exp. Date: _____ Card CVV Number (3 or 4 Digits) _____

Billing Address for Credit Card: _____

Signature: _____

IF PAYING BY CHECK, MAIL FORM TO: FSMS, P.O. Box 850001-243, Orlando, FL 32885-0243

IF PAYING BY CREDIT CARD - EMAIL FORM TO education@fsms.org or FAX TO 850.877.4852

QUESTIONS? CALL 800.237.4384

Provider No. CE11 **fsms.org**

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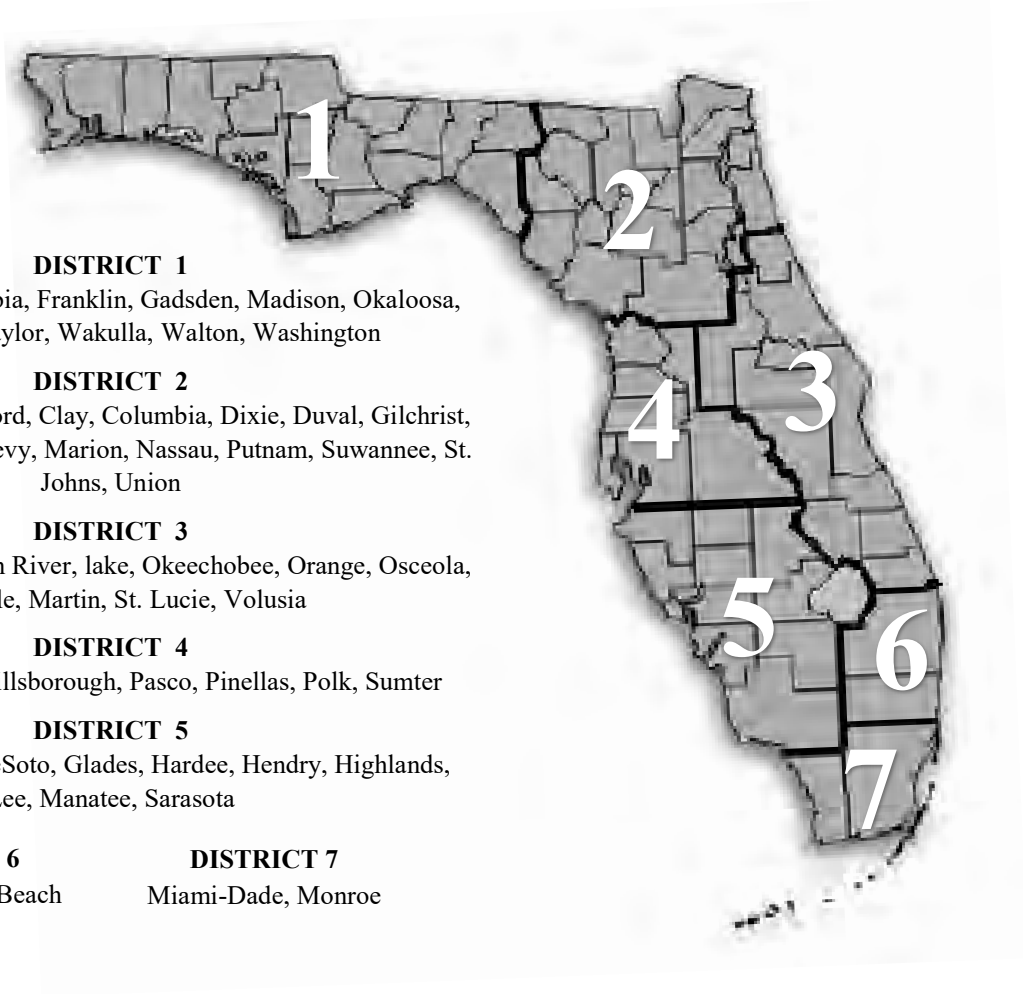

DISTRICT 1
Bay, Calhoun, Escambia, Franklin, Gadsden, Madison, Okaloosa, Santa Rosa, Taylor, Wakulla, Walton, Washington

DISTRICT 2
Alachua, Baker, Bradford, Clay, Columbia, Dixie, Duval, Gilchrist, Hamilton, Lafayette, Levy, Marion, Nassau, Putnam, Suwannee, St. Johns, Union

DISTRICT 3
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DISTRICT 4
Citrus, Hernando, Hillsborough, Pasco, Pinellas, Polk, Sumter

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DISTRICT 6
Broward, Palm Beach

DISTRICT 7
Miami-Dade, Monroe

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Executive Committee	Bob Strayer
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Surveyors in Government	Richard Allen
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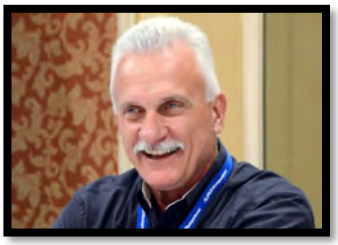
Tom Steckler



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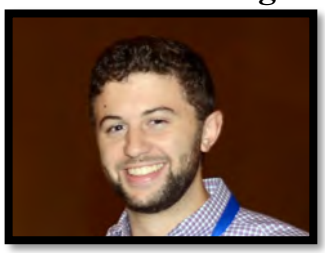
director@fsms.org

Rebecca Culverson

Education Director
education@fsms.org

Dominic Levings



Communications Director
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Cathy Campanile

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Tom's Tip of the Month

The Puzzle of Motivation

Click on the picture below to view the video!

The Florida Surveyor is the official publication of the Florida Surveying and Mapping Society, Inc. (FSMS). It is published monthly for the purpose of communicating with the professional surveying community and related professions who are members of FSMS. Our award winning publication informs members eleven months of the year of national, state, and district events and accomplishments as well as articles relevant to the surveying profession. The latest educational offerings are also included.

2017-2018 Sustaining Firms

A M Engineering, Inc.	941-377-9178
Accuright Surveys Of Orlando, Inc .	407-894-6314
Aerial Cartographics Of America, Inc.	407-851-7880
Agnoli, Barber & Brundage, Inc.	239-597-3111
Aim Engineering & Surveying, Inc.	239-332-4569
All County Surveyors, Inc.	800-860-9119
Allen & Company, Inc.	407-654-5355
Allen Engineering, Inc.	321-783-7443
AllTerra Florida, Inc.	954-850-0795
Alvarez, Aiguesvives & Associates, Inc.	305-220-2424
AM Engineering, Inc.	941-377-7178
American Consulting Engineers Of FL, LLC	813-435-2600
American National Commercial Real Estate Service, LLC	239-963-2245
American Surveying, Inc .	813-234-0103
Amerritt, Inc.	813-221-5200
ARC Surveying & Mapping, Inc.	904-384-8377
Associated Land Surveying & Mapping, Inc.	407-869-5002
ATS Land Surveying, LLC	386-264-8490
Avirom & Associates, Inc.	561-392-2594
Bannerman Surveyors, Inc.	850-526-4460
Barraco And Associates, Inc.	239-461-3170
Bartram Trail Surveying, Inc.	904-284-2224
Baseline Engineering And Land Surveying, Inc.	561-417-0700
Bay Area Sinkhole Investigation & Civil Engineering, LLC	813-885-4144
Bay Area Surveying And Mapping, Inc.	727-271-0146
BBLS Surveyors, Inc.	239-597-1315
Bean Whitaker Lutz & Kareh, Inc.	239-481-1331
Banks Engineering	239-939-5490
Bello & Bello Land Surveying Corporation	305-251-9606
Benchmark Land Services, Inc.	239-591-0778
Benchmark Surveying & Land Planning	850-994-4882
Beta Company Surveying, Inc.	941-751-6016
Betsy Lindsay, Inc.	772-286-5753
Biscayne Engineering Company, Inc.	305-324-7671
Boatwright Land Surveyors, Inc.	904-241-8550
Bock & Clark Corporation	330-665-4821
Bowman Consulting Group, LTD., Inc.	703-464-1000
Bradshaw-Niles & Associates, Inc.	904-829-2591
Brown & Phillips, Inc.	561-615-3988
BSE Consultants, Inc.	321-725-3674
Buchanan & Harper, Inc.	850-763-7427
Buchheit Associates, Inc.	321-689-1057
Bussen-Mayer Engineering Group, Inc.	321-453-0010
Burkholder Land Surveying, Inc.	941-209-9712
C&M Roadbuilders	941-758-1933
Calvin, Giordano & Associates, Inc.	954-921-7781
Cardno, Inc.	407-629-7144
Carter Associates, Inc.	772-562-4191
Caulfield & Wheeler, Inc.	561-392-1991
Causseaux Hewett & Walpole, Inc.	352-331-1976
Central Florida Surveys, Inc.	407-262-0957
Chastain-Skillman, Inc.	863-646-1402
Choctaw Engineering, Inc.	850-862-6611
Civilsurv Design Group, Inc.	863-646-4771
Clary & Associates, Inc.	904-260-2703
Clements Surveying, Inc.	941-729-6690
Coffin & Mclean Associates, Inc.	352-683-5993
Collins Survey Consulting LLC	863-937-9052
Compass Engineering & Surveying, Inc.	727-822-4151
Compass Point Surveyors PL	954-332-8181
Control Point Associates FL, LLC	908-668-0099
Controlcam, LLC	904-758-2601
Countywide Surveying, Inc.	850-769-0345
Cousins Surveyors & Associates, Inc.	954-689-7766
CPH, Inc.	407-322-6841
Craven-Thompson & Assoc, Inc.	954-739-6400
Cross Surveying, LLC	941-748-8340
Culpepper & Terpening, Inc.	772-464-3537
Dagostino & Wood, Inc.	239-352-6085
Deal Land Surveying LLC	407-878-3796
Degrove Surveyors, Inc.	604-722-0400
Dennis J. Leavy & Associates	561-753-0650
Deren Land Surveying LLC	352-331-0010
Diversified Design & Drafting Services, Inc.	850-385-1133
DMK Associates, Inc.	941-475-6596
Donald F. Lee & Associates, Inc.	386-755-6166
Donald W. Mcintosh Associates, Inc.	407-644-4068
Donoghue Construction Layout LLC	321-248-7979
Douglass Leavy & Associates, Inc.	954-344-7994
DRMP, Inc.	407-896-0594
DSW Surveying and Mapping, PLC	352-735-3796
E.R. Brownell & Associates, Inc.	305-860-3866
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Edwin G. Brown & Associates, Inc.	850-926-3016
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England, Thims & Miller, Inc.	904-652-8990
ESP Associates PA	803-802-2440
Evans Land Surveying, Inc.	727-734-3821
Exacta Land Surveyors, Inc.	305-668-6169
F. R. Aleman & Associates, Inc.	305-591-8777
Fabre Engineering, Inc.	850-433-6438
Ferguson Land Surveyors, PLC	727-230-9606
First Choice Surveying, Inc.	407-951-8655

2017-2018 Sustaining Firms

Flanary Surveying and Mapping, Inc.	941-915-8655
Florida Engineering and Surveying, LLC.	941-485-3100
Foley/Koloarik, Inc.	941-722-4561
Fortin, Leavy, Skiles, Inc.	305-653-4493
Franklin Surveying & Mapping, Inc.	407-846-1216
Ganung-Belton Associates, Inc.	407-894-6656
Gary G. Allen, Regis Land Surveying, Inc.	850-877-0541
Geodata Consultants, Inc.	407-732-6965
Geoline Surveying, Inc.	386-418-0500
Geomatics Corp.	904-824-3086
GeoPoint Surveying, Inc.	813-248-8888
George F. Young, Inc.	727-822-4317
GeoSurv LLC	877-407-3734
Germain Surveying, Inc.	863-385-6856
Global One Survey, LLC	786-486-8088
GPI Geospatial, Inc.	407-851-7880
GPServ, Inc.	407-601-5816
Greenman-Pedersen, Inc.	352-547-3080
GRW Engineers, Inc.	859-223-3999
Gustin, Cothern & Tucker, Inc.	850-678-5141
H. L. Bennett & Associates	863-675-8882
Hamilton Engineering & Surveying	813-250-3535
Hanson Professional Services, Inc.	217-788-2450
Hanson, Walter & Associates, Inc.	407-847-9433
Hayhurst Land Surveying, Inc.	772-569-6680
HLSM LLC	407-647-7346
Hole Montes, Inc.	239-254-2000
Honeycutt & Associates, Inc.	321-267-6233
HSA Consulting Group, Inc.	850-934-0828
Hutchinson, Moore & Rauch	251-626-2626
Hyatt Survey Services, Inc.	941-748-4693
I.F. Rooks & Associates, Inc.	813-752-2113
Inframap Corp.	804-550-2937
John Ibarra & Associates, Inc.	305-262-0400
John Mella & Associates, Inc.	813-232-9441
Johnson, Mirmiran & Thompson, Inc.	813-314-0314
Johnston's Surveying, Inc.	407-847-2179
Jones, Wood & Gentry, Inc.	407-898-7780
Keith & Associates, Inc.	954-788-3400
Keith & Schnars, P.A.	954-776-1616
Kendrick Land Surveying	863-533-4874
King Engineering Associates, Inc.	813-880-8881
Kugelmann Land Surveying, Inc.	321-459-0930
Kuhar Surveying & Mappin LLC	386-295-8051
L&S Diversified, LLC	407-681-3836
Landmark Engineering & Surveying Corporation	813-621-7841
Leading Edge Land Services, Inc.	407-351-6730
Leiter Perez & Associates, Inc.	305-652-5133
Leo Mills & Associates	941-722-2460
Littlejohn Engineering Associates, Inc.	407-975-1273
Lochrane Engineering, Inc.	407-896-3317
Long Surveying, Inc.	407-330-9717
Ludovici & Orange Consulting Engineers, Inc.	305-448-1600
Manuel G. Vera & Associates, Inc.	305-221-6210
Mapping Resource Group, Inc.	386-439-4848
Marco Surveying & Mapping, Inc.	239-389-0026
Mark Dowst & Associates, Inc.	386-258-7999
Maser Consulting P.A.	813-207-1061
Massey-Richards Surveying & Mapping LLC	305-853-0066
Masteller, Moler & Taylor, Inc.	772-564-8050
McKim & Creed, Inc.	919-233-8091
McLaughlin Engineering, Co.	954-763-7611
Mehta & Associates, Inc.	407-657-6662
Metron Surveying And Mapping LLC	239-275-8575
Millman Surveying, Inc.	330-342-0723
Mock Roos & Associates, Inc.	561-683-3113
Moore Bass Consulting, Inc.	850-222-5678
Morgan & Eklund, Inc.	772-388-5364
Morris-Depew Associates, Inc.	239-337-3993
Murphy's Land Surveying, Inc.	727-347-8740
Northstar Geomatics, Inc.	772-781-6400
Northwest Surveying, Inc.	813-889-9236
O'Brien Suiter & O'Brien, Inc.	561-276-4501
Oceanside Land Surveying LLC	386-763-4130
Omni Communications LLC	813-852-1888
On The Mark Surveying LLC	321-626-6376
Peavey & Associates Surveying & Mapping, PA	863-738-4960
Pec - Survey & Mapping LLC	407- 542-4967
Pennoni Associates, Inc.	215-222-3000
Pickett & Associates, Inc.	863-533-9095
Pittman, Glaze & Associates, Inc.	850-434-6666
Platinum Surveying & Mapping LLC	863-904-4699
Point To Point Land Surveyors, Inc.	678-565-4440
Polaris Associates, Inc.	727-461-6113
Porter Geographical Positioning & Surveying, Inc.	863-853-1496
Precision Surveying & Mapping, Inc.	727-841-8414
Pulice Land Surveyors, Inc.	954-572-1777
Q Grady Minor And Associates, PA	239-947-1144
Robayna & Associates, Inc.	305-823-9316
Reece & White Land Surveying, Inc.	305-872-1348
Rhodes & Rhodes Land Surveying, Inc.	239-405-8166
Richard P. Clarson & Associates, Inc.	904-936-2623
Riegl USA	407-248-9927
Ritchie & Associates, Inc.	850-914-2774
RJ Rhodes Engineering, Inc.	941-924-1600
Robert A. Stevens & Associates	863-559-1216
Robert M. Angas Associates, Inc.	904-642-8550
Rogers Engineering LLC	352-622-9214
Rogers, Gunter, Vaughn Insurance, Inc.	850-396-1111
S&ME, Inc.	407--975-1273

SCR & Associates NWFL, Inc.	850-265-6979
Sergio Redondo & Associates, Inc.	305-378-4443
Shah Drotos & Associates, Inc.	954-943-9433
Shannon Surveying, Inc.	407-774-8372
Sherco, Inc.	863-453-4113
Sliger & Associates, Inc.	386-761-5385
Southeastern Surveying And Mapping Corporation	407-292-8580
Spalding DeDecker Associates Inc	248-844-5404
Stephen H Gibbs Land Surveyors, Inc.	954-923-7666
Stephen J. Brown, Inc.	772-288-7176
Strayer Surveying & Mapping, Inc.	941-497-1290
Suarez Surveying & Mapping	305-596-1799
Survtech Solutions, Inc.	813-621-4929
Tetra Tech, Inc.	407-839-3955
Thurman Roddenberry & Associates, Inc.	850-962-2538
Tuck Mapping Solutions, Inc.	276-523-4669
Upham, Inc.	386-672-9515
Wade Surveying, Inc.	352-753-6511
Wallace Surveying Corporation	561-640-4551
Wantman Group, Inc.	561-687-2220
WBQ Design & Engineering, Inc.	407-839-4300
Winningham & Fradley, Inc.	954-771-7440
Woolpert, Inc.	937-461-5660
York & Associates Engineering, Inc.	229-248-0141
ZNS Engineering LLC	941-748-8080

Additional Information

Upcoming Events

February 6-7, 2018
Florida BPSM Meeting
Gainesville

February 9-10, 2018
Board of Directors Meeting
Tallahassee

March 18-24, 2018
National Surveyor's Week

Past Presidents

1956	Robert S. Harris	Gordon R. Niles, Jr.
H.O. Peters	Paul T. O'Hargan	Dennis E. Blankenship
Harry C. Schwebke	William G. Wallace, Jr.	W. Lanier Mathews, II
John P. Goggin	Robert W. Wigglesworth	Jack Breed
R.H. Jones	**1980**	**2000**
1960	Ben P. Blackburn	Arthur A. Mastronicola
Hugh A. Binyon	William B. Thompson, II	Michael H. Maxwell
Russell H. DeGrove	John R. Gargis	John M. Clyatt
Perry C. McGriff	Robert A. Bannerman	David W. Schryver
Carl E. Johnson	H. Bruce Darden	Stephen M. Gordon
James A. Thigpenn, III	Buell H. Harper	Richard G. Powell
Harold A. Schuler, Jr.	Jan L. Skipper	Michael J. Whitling
Shields E. Clark	Steven M. Woods	Robert W. Jackson, Jr.
Maurice E. Berry II	Stephen G. Vrabel	Pablo Ferrari
William C. Hart	W. Lamar Evers	Steve Stinson
Frank R. Schilling, Jr.	**1990**	**2010**
1970	Joseph S. Boggs	Dan Ferrans
William V. Keith	Robert L. Graham	Jeremiah Slaymaker
James M. King	Nicholas D. Miller	Ken Glass
Broward P. Davis	Loren E. Mercer	Russell Hyatt
E.R. (Ed) Brownell	Kent Green	Bill Rowe
E.W. (Gene) Stoner	Robert D. Cross	Dale Bradshaw
Lewis H. Kent	Thomas L. Conner	Lou Campanile, Jr.

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