



The Florida Surveyor

Volume XXVII, Issue 9

October 2019

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Fall!**

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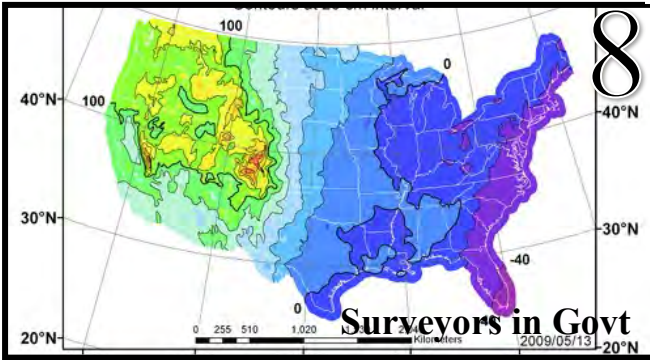


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Photo: Stock Photography

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President's Message



Greetings to all my friends and colleagues. I hope you are all doing well and enjoyed your summer. One definite thing we can all be grateful for is no hurricanes this year so far.. hope I didn't just jinx it. :)

I have been attending various Chapter meetings around the state over the last couple of months and I must say I am impressed by ALL of you. The leadership is great and the participation of the members is wonderful. You should all be proud of yourselves and continue with the great work you are doing.

Last week I was pleased to be able to attend the National Society of Professional Surveyors Fall Meeting in Orlando. Attending both the Spring and Fall meetings this year has been a real eye-opener for me and am so grateful for the opportunity to represent Florida there as your FSMS President. Folks always ask "What does NSPS do for me?" and I can answer that question now more fully.

While most of us are working in "our own little world" (myself included) oblivious to things that could dramatically influence or impact our day to day work, there are "others" who watch out for our profession both locally here in Florida as well as on the national level. I attended the NSPS Government Affairs Committee meeting last Friday. They are monitoring no less than 20 legislative bills ranging being derived from Appropriations to Commerce to Education to Homeland Security to Labor to Transportation to FCC and Department of the Interior. The range of topics is staggering and AFFECTS US ALL.

We all know the inadequacies of the current NFIP program and FEMA Maps. This is something that NSPS has been working on legislatively for funding and supporting bills that get agencies to work together. This is just one example and there are so many more examples.

NSPS is working hard on their "Get Kids into Surveying" program. We all know both locally and nationally how important this is to the future of our profession. They have posters and programs that are available for the asking. This year they attended the American School Counselors Association national meeting. What an opportunity to get Geomatics (Surveying and Mapping) known to those that guide our young people into suitable professions.

Workforce Development is another area of critical importance to our profession. We are ALL facing the same problems across the country in finding solid technical staff for both field and office as well as dwindling numbers of people in pursuit of licensure. One avenue that most of us may not have considered are the pool of candidates coming out of the military, many who have surveying experience. There are programs that can assist you with finding these candidates and getting them on board before they are discharged. Many are so very grateful to have a job they can go straight into to support their families.

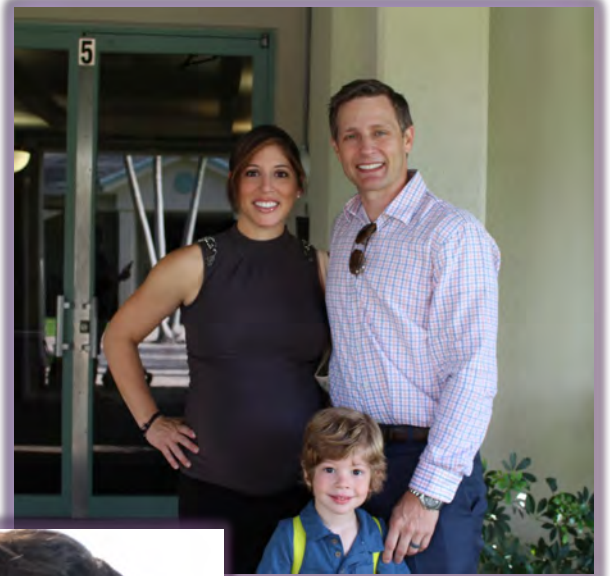
Trigstar is another program that is alive and well at NSPS. They have some great folks taking the lead in this area and were able to award a \$5000 scholarship to a deserving candidate this year. The NSPS Foundation manages some 15 or so scholarship funds.

We all struggle with declining Membership at both the state and local chapter levels. NSPS can help with that. They have proven Membership Drive procedures that can be utilized at both levels to improve membership numbers. I will be bringing this to the attention of the State Membership Committee for their consideration.

I hope you see the benefit of being an NSPS member and I encourage you to get involved at that level. It is worth the effort.

"I know of no more encouraging fact than the unquestioned ability of a man to elevate his life by conscious endeavor." --Henry David Thoreau

Dianne Collins
(863) 937-9052
dcollins@collinssurvey.com



We wish to congratulate Jim Sullivan and his wife on their new beautiful baby girl, Kara Rose!! We know Oliver will be a good big brother.



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Surveyors in Government



Richard Allen, PSM, CFM

October 2019

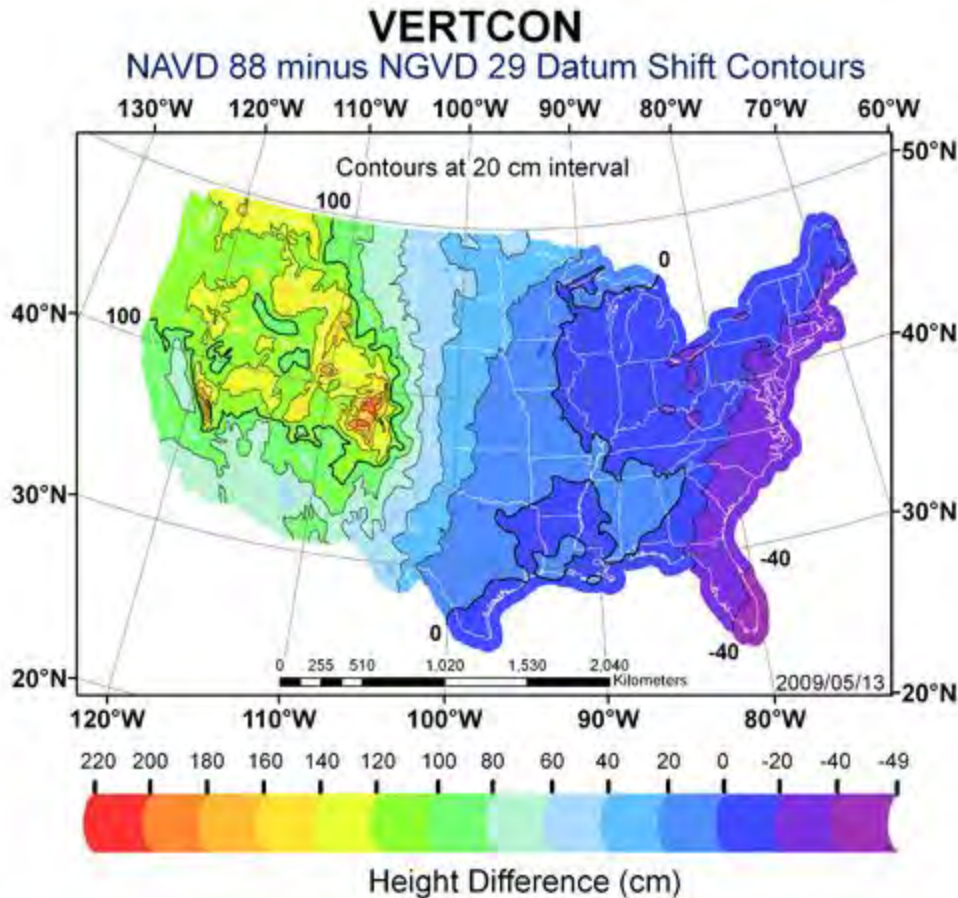
As I am writing this article I am attending the NSRS 2022 Overview & Prospective put on by the University of Florida, Hillsborough Community College and NGS in Plant City. I bring this topic up as I am not sure if all Government Surveyors are aware of the datum changes that are coming. The official names of the two datums are NAPGD2022 and NATRF2022 respectively.

The North American Datum of 1983 (NAD83) is being replaced by the North American-Pacific Geopotential Datum of 2022. ***NAPGD2022***

The North American Vertical Datum of 1988 (NAVD88) is being replaced by the North American Terrestrial Reference Frame of 2022. ***NATRF2022***

Now is the time to get ready to be involved in the process and prepare your organization for this pending change. This is even truer if your agency is still working in NGVD 29 Datum. Getting a plan together to update or translate your vertical and horizontal control networks will take coordination and planning to be ready to address this change. One point of consideration once the network has changed is: How long should I publish both NAPGD2022 and NAD83 values? The same question will pertain in how long should the new and old vertical datums be published. For some time in our organization both NGVD 29 and NAVD 88 were both published. Eventually we stopped publishing 29 Datum as we were not allowing the data to be submitted for permitting of private development, nor were we allowing it for Capital Improvement Projects. Even today we have a problem with NGVD 29 submitted plans and surveys making it in for permits that have skipped the survey review process. They are violations of the City's Engineering Standards Manual but at that point there is nothing you can do about it.

Surveyors in Government

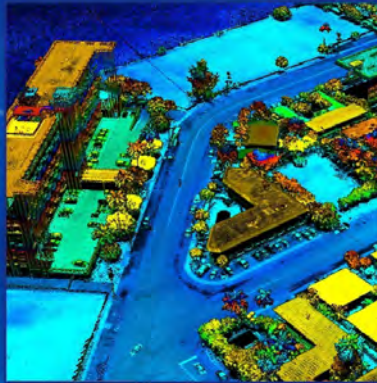


In Central Florida it is roughly between 0.89 and 1.05 of a foot higher to NGVD 29 from NAVD 88 Datum. This is a substantial issue with our archival process as this data includes inventory or assets of items that are used for our GIS inventory. At nearly one foot of difference it can be easier to spot that was is proposed for the next datum change which is Central Florida comes in roughly around 0.3' +/-, a number much more difficult to catch and to keep track of. The time to plan is now and get ready for the changing times. I still don't have my plan of action as it stands today but believe it is on my mind. Have a good day!

You can reach me at Richard.Allen@orlando.gov or 407.246.2788.

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A Look Below
Mapping Caves and Sinkholes

BACKSIGHTS & FORESIGHTS



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A Look Below *Mapping Caves and Sinkholes*

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**Alfie Cross
Publications Chairman**

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"Backsights and Foresights" is an official publication of the Florida Society of Professional Land Surveyors (FSPLS) and is published quarterly by the membership for the betterment of the surveying profession. The Journal is financed by subscription of the membership, although advertisements, as indicated below, are welcomed from the service and product industries relating to the needs and activities of the profession.

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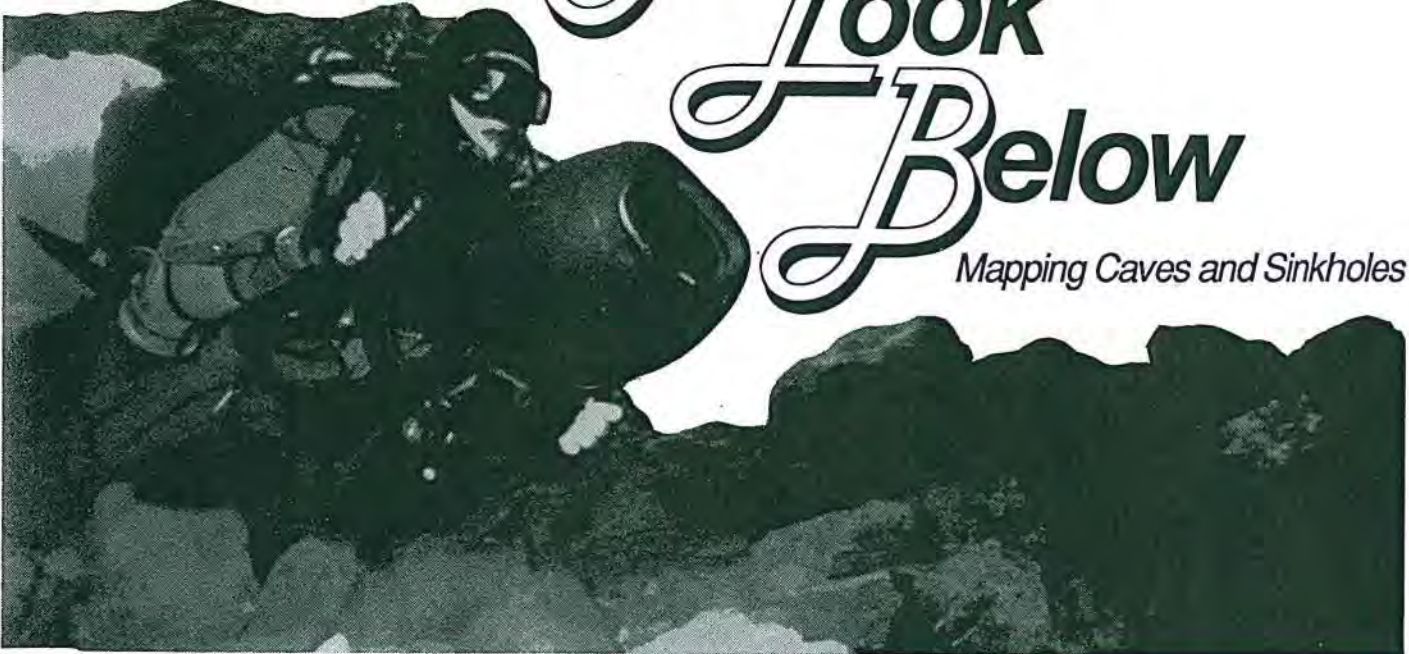
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A Look Below

Mapping Caves and Sinkholes



Dustin Clesi using a diver's propulsion vehicle (DPV) in the Peacock Springs Cave System located in Suwannee County, Florida.

*by Alan Nobles, President
Nobles, Varnum and Associates, Inc.
Tallahassee, Florida*

INTRODUCTION

In 1968, 550 acres in the Apalachicola National Forest, south of Tallahassee, Florida, was designated as a federal geological area. This area, known as the Leon Sinks Geological Area, is mostly an irregular limestone region with many sinkholes, underwater streams and caverns (commonly referred to as a karst plain). Of the five major sinks in the area, three have been explored and surveyed by cave divers: Little Dismal (Hammock Sink), Big Dismal and Sullivan Sink. The underwater cave system of Sullivan Sink was connected to the Emerald Sink system on January 9, 1988. This connection makes the system the world's longest with over 41,000 feet of explored caves.

One of the cave divers involved with this connection and the mapping

of the projects within this area was William (Bill) P. McFaden, a licensed land surveyor, a long-time work partner and a good friend. Bill was a member of the National Association for Cave Diving (NACD) and the National Speleological Society Cave Diving Section. He was also chairman of the NACD's Exploration and Survey Committee and past president of the Florida State University Cave Club.

*Unfortunately, the only
time most people hear
about cave diving is when
someone drowns in a
cave system and it makes
the news.*

Bill, being an excellent land surveyor, had a unique talent for producing cave maps with great detail and had an en-

thusiasm for caves and mapping that was contagious.

Bill published his first map in December of 1987, the underwater cave system of McBride Slough Cave. The map incorporated mapping standards common to the survey profession and introduced these same standards to the cave diving community. This map showed cave diving surveyors the potential of bringing uniformity and precision to their maps.

On May 15, 1988, on the last mapping dive for the Little Dismal project, Bill developed an air embolism due to a complex chain of events and died in the cave system. Though Bill has passed away, his techniques and ideas for producing quality underwater cave maps has endured. With Bill's survey notes of Little Dismal and the retention of his style and standards, the Little Dismal map was brought to publication.

The following paragraphs will briefly review the techniques used in the



surveying of this cave and try to give a basic understanding of cave diving.

CAVE DIVING

Unfortunately, the only time most people hear about cave diving is when someone drowns in a cave system and it makes the news. Over three hundred people have perished attempting to dive in water-filled caves. This includes certified divers, instructors, dive masters, Navy divers and commercial divers. This fact alone should show that cave diving is not a natural extension of the openwater or scuba diving that most people are familiar with and that a great deal of training and special equipment is needed to dive caves

safely. Through analysis of nearly 400 of these accidents and near accidents by the National Speleological Society Cave Diving Section, the Society has developed techniques, equipment and basic safety rules that are now used in cave diving. The following is an explanation of the basic rules and will highlight the basic techniques and equipment needed in cave diving.

1. Be trained in cave diving and have a mastery of the techniques used in cave diving. Cave diving is a highly specialized type of diving and an openwater certification will not come close to preparing people for the closed environment of a cave system.

2. Always utilize a direct continuous guideline to the surface. A con-

tinuous guideline is utilized for many reasons — it prevents the divers from getting lost in the cave, allows them to find the entrance in silty conditions, and even enables them to get out if all lights fail.

3. Always reserve a minimum of 2/3 of your air for your exit. This rule is known as the "Thirds Rule." Divers use 1/3 of their air supply for penetration, 1/3 of their air for the exit, and reserve 1/3 of their air for use in emergencies. The emergencies might include getting tangled in the guideline, getting stuck in a rock passage, or any type of air supply failure where their partner would breathe the last remaining 1/3 of air to effect a safe exit. Most cave divers also carry redundant regulators,

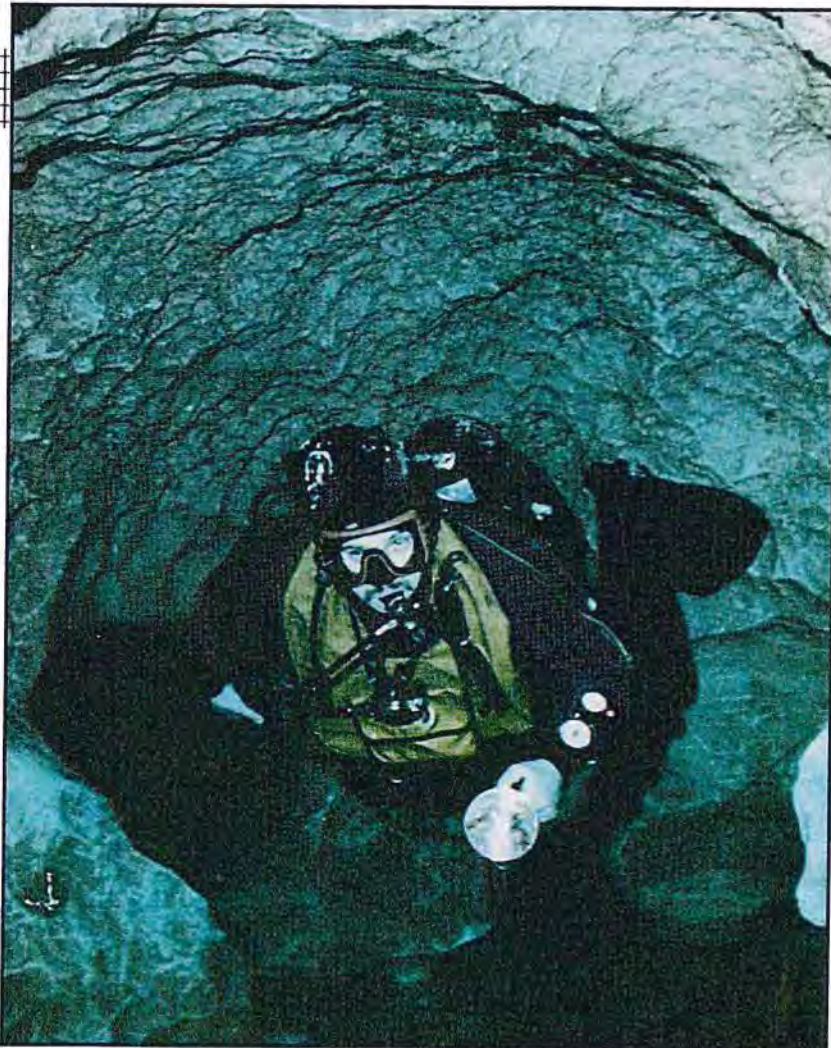


Photo by: Cindy Kirby
Mark Kirby swimming in the Little River Springs Cave System located on the beautiful Suwannee River near Branford, Florida.

dual orifice manifolds for management of each regulator in case of a regulator failure, and a 6- to 9-foot hose on one regulator for sharing air in small passageways or restrictions.

4. Dive no deeper than 130 feet. Most diving certification agencies, like NAUI or YMCA, recommend a maximum safe diving limit of 130 feet. As you will see, the Dismal Project pushes into the 200 foot range. These depths are hard on even the most experienced cave diver because of the difficulties of narcosis, limited bottom time, long decompression times (up to 4 hours total dive time), and the cold water itself.

5. Carry a minimum of three lights per person. Most cave divers carry one primary light with a long burn time and bright illumination along with smaller backup lights.

Due to the great depths and distances involved in the exploration of parts of these particular caves, the explorer and mapper is not without risk. Hopefully, this risk is now being minimized by better technology, use of qualified personnel and proceeding in a formal and well-planned manner.

SURVEYING THE CAVE

As in most caves, Little Dismal had a permanent guideline laid throughout the cave system for safety purposes. This permanent guideline line was

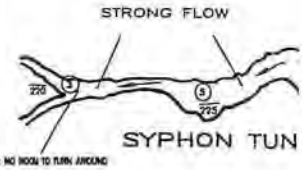
LITTLE DISMAL CAVE SYSTEM (HAMMOCK SINK)

LOCATED IN THE LEON SINKS GEOLOGICAL AREA
WITHIN THE APALACHICOLA NATIONAL FOREST,
LEON COUNTY, FLORIDA (APALACHICOLA -
WAKULLA RANGER DISTRICTS)

SURVEYED IN 1987 THRU 1988

| SURVEYORS | SAFETY DIVERS | EXPLORERS |
|---------------|---------------|----------------|
| BILL McFADEN | PAUL DARLING | BOB GOODMAN |
| JOHN WATTS | JOHN MALIK | KIRBY SULLIVAN |
| STEVE GERRARD | BILL MAIN | SHECK EXLEY |
| BILL GAVIN | DOUG HAND | BILL GAVIN |
| PARKER TURNER | STEVE POWELL | BILL MAIN |
| | | BILL McFADEN |

THIS MAP IS DEDICATED TO THE MEMORY OF
WILLIAM P. McFADEN, JR. WHOSE LOVE AND
DEDICATION TO CAVE EXPLORATION AND MAPPING
WERE UNMATCHED.

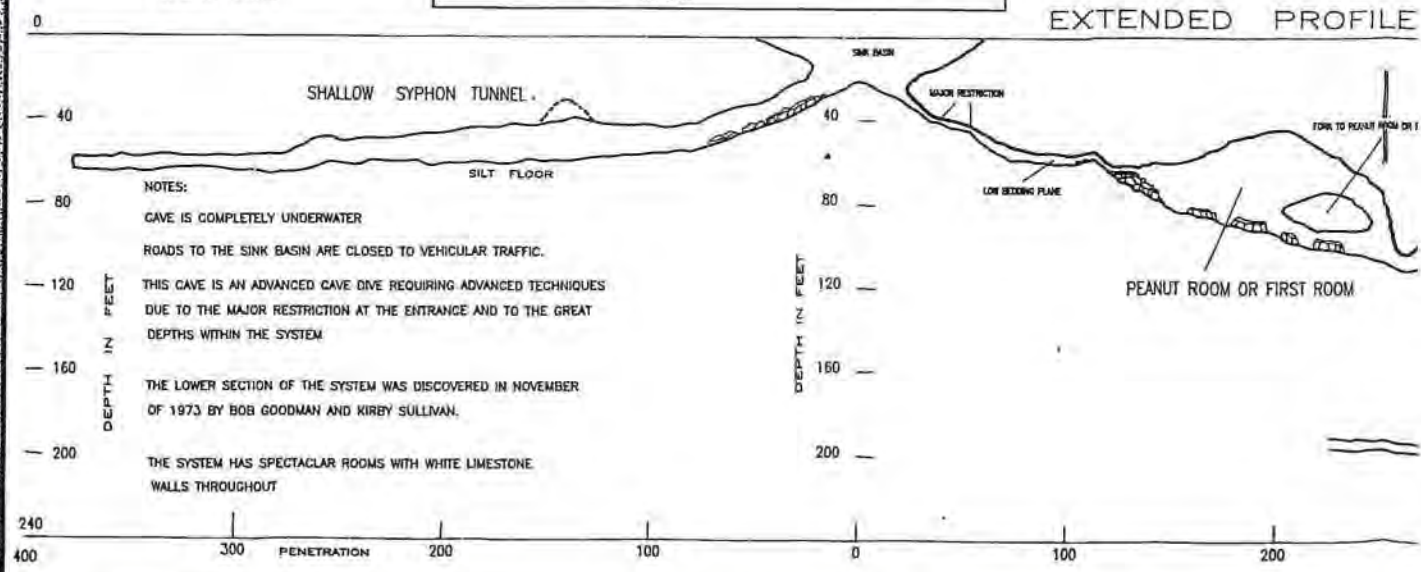
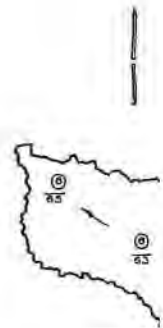
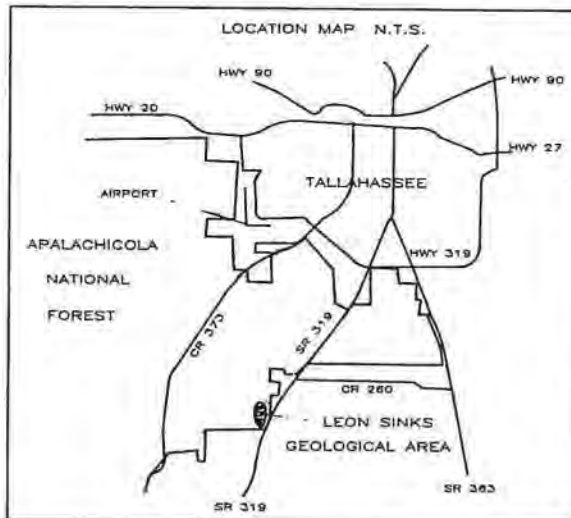


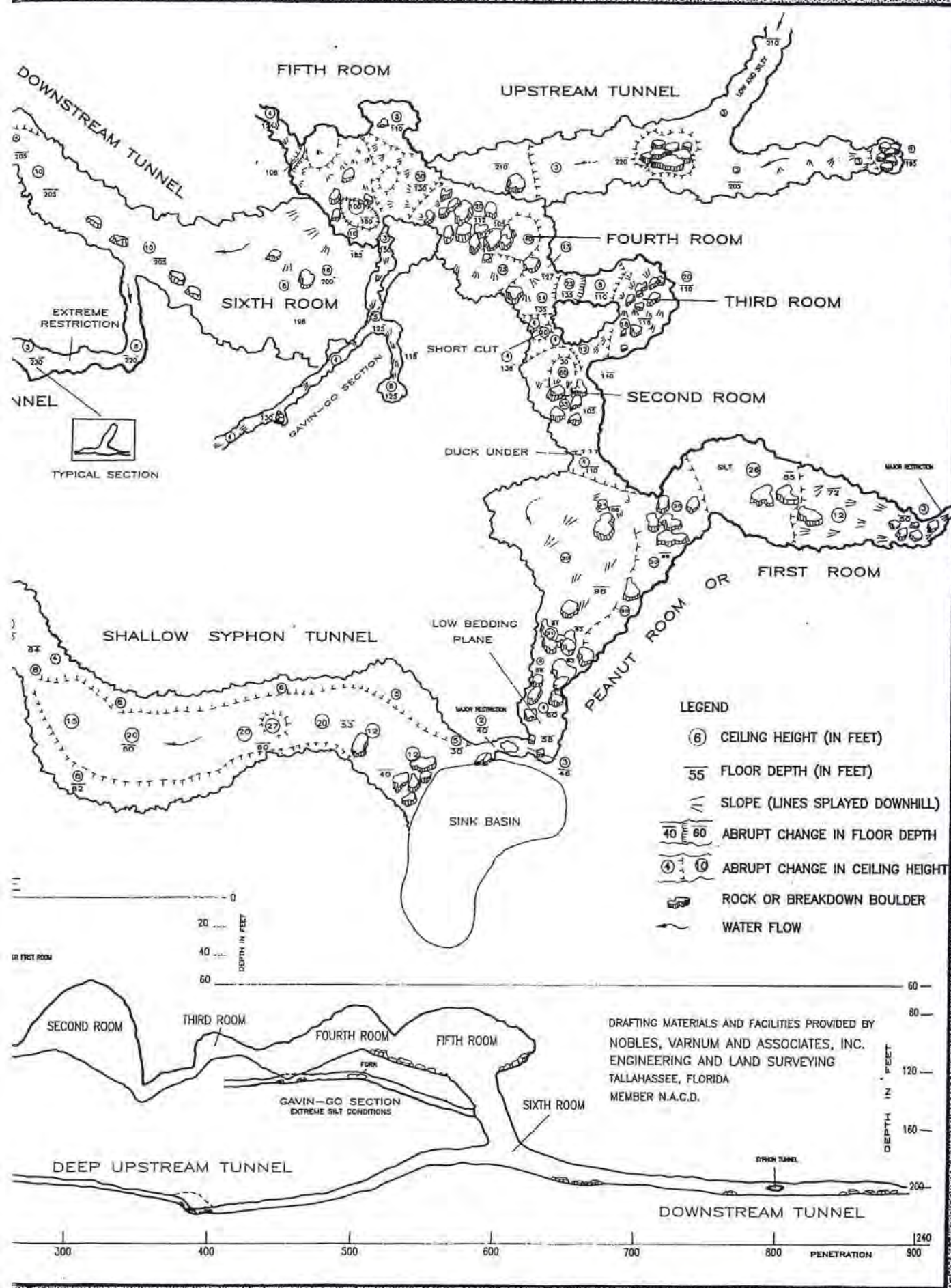
DATE: OCTOBER 25, 1988

CARTOGRAPHY BY: BILL McFADEN, REGISTERED LAND SURVEYOR NO. 4308

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DATE OF LAST REVISION: DECEMBER 8, 1988





replaced with a new guideline that had been knotted at 10 foot intervals and was used as a traverse line and the baseline for the survey. Some extra lines were also laid to supplement the main baseline in some of the large rooms within the system.

The guideline was then surveyed by taping the distance between the tie points in the line, recording the depth at each tie point and reading the azimuth of the actual line between tie points with a compass. The knotted line was also used as a check against the taped measurements by adding the number of 10 foot stations along the line.

In preparation for surveying, a special survey slate was made for the purpose of recording cross sections, notes and azimuth readings on the guideline by use of a compass that is mounted on the slate. The compass was mounted so the pointer is parallel to the long edge of slate which then allows compass readings to be obtained by holding the slate parallel to the guideline. Small sheets of mylar were cut to size and marked with the same type of grid lines you would see in a field book and were held on the slate by clips or rubber bands. As the sheets were filled by the diver writing with a soft pencil on the mylar, they were passed on to the person plotting the data — eliminating the need to

rewrite the data. The divers also used a standard note form showing the station, depth, compass heading and distances to side walls, floor and ceiling at each station.

The only other survey instrument used was the depth gauge. The depth

gauge was used to obtain the relative depths of the floors and ceilings of the cave as well as the end of each guideline. These measurements would then be used to reduce slope distances to horizontal distances. We found that the depth gauges used in this survey contained errors due to the fluctuation in the actual water level of the sink basin, the lack of an accurate method to calibrate the gauges, and the lack of allowance for differences in salt and fresh water density. Although the errors were not large and the elevations used for the mapping were relative depths from the water surface only, this is an area that needs to be reviewed.

When diving at depths greater than 100 feet, air supply is used up rapidly since a greater volume of air is required at depth for each breath to prevent the collapse of the lungs. This limits the duration of the deep dive also creating longer periods of decompression. This limited the actual survey time on some dives to only 10 minutes with a total dive time of 3 hours or more. Also, a major restriction (small passageway) had to be dealt with at the start of each dive into the system.

As the dives became longer and grew deeper, the divers started using special equipment and techniques. To help maintain body heat, dry suits were

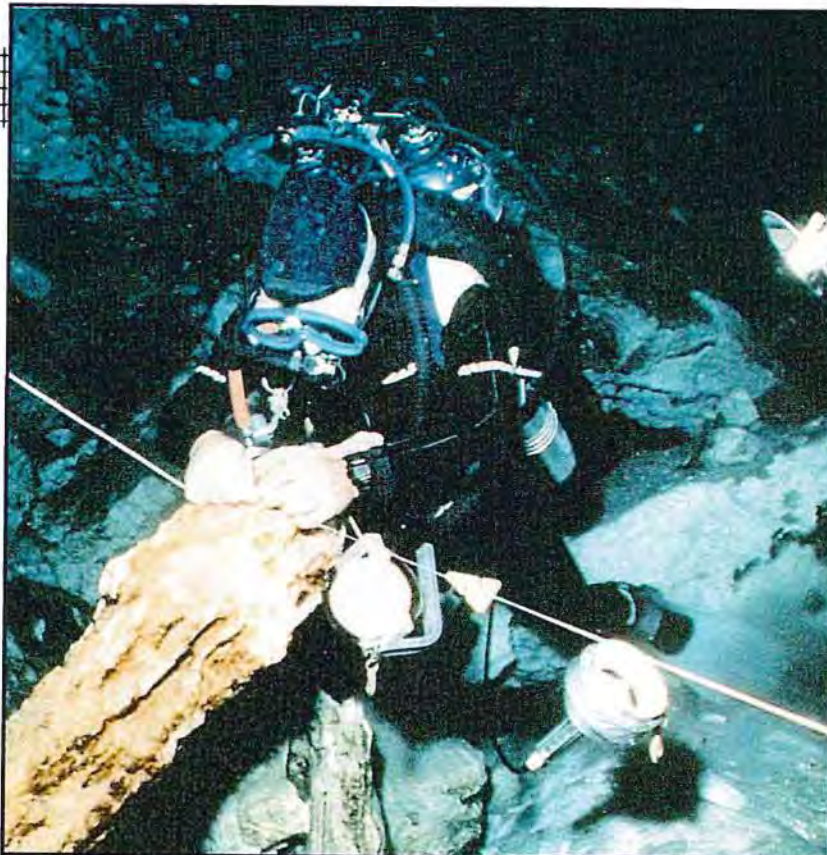


Photo by: Ed Fiorell
Mike Madden working with guideline in the Mayan Blue Lenote Cave System located near Talwan, Mexico.



Photo by: Mario Mitchell
Two cave divers swimming past the Hill 400 offshoot tunnel in the Devil's Eye Cave System at Ginnie Springs Campground.

used to help combat the cold water (normal wet suits would compress at deeper depths and lose their insulation value). To help reduce the diving time, some divers used propulsion vehicles or scooters. Bill Gavin of Panama City, Florida, devised a scooter that would adjust to the outside water pressure and not be crushed at the deeper depths. This was done by attaching a regulator to the front of the scooter along with a small bottle of gas. As the pressure inside the scooter dropped, the regulator would compensate by releasing air into the scooter. Bill also attached a pressure relief valve from a dry suit or buoyancy compensator to vent the excessive pressure from the scooter during the ascent. Along with this, the divers used mixed gas on many dives to help cut down on the effects of nitrogen narcosis, and bottles of pure O₂ were used to cut the decompression times. To help pass the time on the decompression stages, paperback books were cut into sections and put in zip lock bags. The diver could read each section before the water had too much of an affect on the pages.

The divers encountered low visibility on many of the dives due to the silty conditions in many of the small passageways within parts of the cave. Some passageways became too small to negotiate and the diver would have to back out. As you could guess, getting stuck in a passageway at a depth of 150 feet or more while exploring a new passage could be quite hazardous.

On the final dives, rock samples were taken every 10 feet vertically within the cave system to establish a relationship between the different beds of limestone and the conduit formations.

After all the data was collected, it was reduced to horizontal distances and the data was then checked and plotted out on 10 by 10 grid paper. Due to the effect of nitrogen narcosis, it was common to find the transposition of figures or the misreading of the compass at the deeper depths. Obviously, due to human limitations and the existing conditions, the best diver is

| STA | DEPTH | AZIMUTH | DIST | DIST | X-SEC |
|------|-------|-----------|------|------|------------------------------------|
| Rock | 122 | 265 | | | VAST |
| | | | 140 | | |
| A1 | 115 | | | | |
| | | 335 | 90 | | 20 ⁵ 0 ² |
| A2 | 120 | | | | |
| | | 332 | 45 | | 10 ¹⁰ 1 ¹ |
| A3 | 110 | | | | |
| | | 350 | 50 | | 10 ¹⁵ 0 ⁸ |
| A4 | 105 | | | | |
| | | 345 | 20 | | 8 ¹⁵ 0 ⁸ |
| A5 | 95 | | | | |
| | | 325 | 30 | | |
| A6 | | | | | |
| | | 355 | | | |
| A7 | 85 | | | | |
| | | 315 | 30 | | |
| A8 | 75 | | | | |
| | | Clip Here | | | |

SURVEY NOTES

X-SECTION
TYP. →

10
10 + 1
1

10' to CEILING
1' to FLOOR
10' to LEFT WALL
1' to RIGHT WALL

going to make mistakes. Due to this fact and the fact that there was no way to close much of the recorded traverse data, the greater the number of people familiar with the cave system that reviewed the plotted map helped to reduce gross errors in parts of the map and also added much of the smaller details.

After the map was checked, it was then input into a HASP computer system utilizing a digitizer. The text was then added, reviewed and plotted on a 40-scale and a 100-scale map. The finished plotted map contained over 16,000 data points, and it took about 35 minutes for the plotter to do an ink drawing.

SINKHOLES AND CAVES — WHY MAP THEM?

Sinkholes are a natural and common geologic feature in areas underlain by limestone and other rock types that are soluble in natural water. The sinkholes in Florida are mostly a product of the solution erosion and are analogous to the valleys carved by rivers. Just as rivers constantly erode the land surface by carrying away particles of rocks a grain at a time, the limestone underground is also slowly carried away an ion at a time by the slightly acidic groundwater, and has, over a period of time, formed a complex system of natural subsurface conduits (underwater caves). Surface erosion by rivers is well understood and the effects of flooding and pollutants from the rivers can easily be seen and to some degree controlled. However, the information on underwater conduits is not well known and mapping these conduits is the first step in understanding erosion and the effects of flooding and pollutants that enter into these conduits. The effect that subsurface systems have on the dispersment of surface pollutants is not presently known. Since 80 percent of the drinking water in the State of Florida is filtered through these limestone and dolomite formations, surveying and explorations of these underwater conduits is of great interest to many of the science fields, as well as to cave divers themselves. Re-

searchers use the survey data obtained from divers as the basic reference point. Without this information, proper management of these vital groundwater resources is impossible and actual mismanagement is highly probable.

CONCLUSION

Cave diving always has been, and probably still is, a dangerous sport. It is only by experience, in openwater surroundings as well as underground, that little troubles can be overcome early and be prevented from assuming major status. The equipment must be in perfect working order, you must be psychologically attuned to the proposed venture and proceed with the full knowledge and anticipation of possible hazards. Mistakes can be corrected if the individual is properly equipped, but bad judgment is far more apt to prove fatal than in normal diving.

The men that surveyed the Little Dismal Cave System were highly ex-

perienced divers with the individual qualities needed to explore and map these depths. The maps produced from their data were drawn by experienced surveyors using the standards common to the surveying profession. It is hoped that the maps of this cave system will serve many purposes other than that of just planning safe cave dives, but may open our eyes as surveyors to a whole new underwater world of surveying that is in need of our mapping skills.

BIBLIOGRAPHY

Bozanic, Jeffrey — *Advanced Diving: Technology and Techniques, Cave Diving.*

Exley, Sheck et. al. (1986) — *N.S.S. Cave Diving Manual.*

Farr, Martyn — *The Darkness Beckons: The History and Development of Cave Diving.*

Stanton, Gregg R.; Parker, Turner A.; *Diving Operations Manual for the Leon Sinks Geological Area* (unpublished).

For more information on cave diving, please contact:

National Association of Cave Diving
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Where It All Began For Me

By: Robert Heggan Jr., PSM, PLS

Where it all began...

I remember sitting in the humble block building that this sign once had adorned heated by a kerosene stove. The smell of the kerosene stove, the Olivetti adding machine burning ozone and my Grandfather's favorite pipe tobacco filled the single room building. My grandfather would sit me at the drafting table, where I would trace old blueprints on to vellum occasionally asking me to help him read from his Vega's Logarithms. He showed me how to "point" lath and hubs that he bought from the local cedar mill. He taught me the art of surveying at a very young age and how to identify ancient lines of possession by showing me overgrown blazes, trees blistered by barbed wire long since rusted away, balk lines where overgrown plowed fields once met or where mature woods once met open fields and multitude of other



things that made me appear as a mystic whenever I was able to walk up to a corner that no one could find. I would hold the "dumb" end of the "chain" not really caring of what the term implied; all that I knew was that I was spending time with my Grandfather.

Over time, he taught me how to read a chain and even how to read the target to the nearest 0.001 on the Philadelphia rod and how to read the vernier on his 1908 K & E Transit. He was a patient, kind man and I don't think that any time during those times did I ever hear him raise his voice.

I worked with my Grandfather until age 13, when he partnered with his long-time friend, Earl Rehmann, to start Adams, Rehmann & Heggan. As I look back on a profession that has been as rewarding as anyone could imagine, I recall these early days. These were lessons that no book nor classroom could ever impart. The beauty of it all is that I didn't know that I was learning but, unlike the "Karate Kid", it was far from drudgery.

Reuben D. Heggan Jr. was an inspiration to many in our family of surveyors, beside me, that included his brother Elwood, my father Robert and his brother Richard. He was the quintessential country surveyor and a respected member of the community. The day he left us was unfortunate of the fact that I never got to thank him for the gift that he had given me. Although it has been over 35 years since his passing, he continues to inspire me through my fond memories.

Isn't amazing what looking at an old rusted sign can do?



Did YOU Ever WONDER Why?

Michael Whiting, PSM

Why is the letter “F” used for failure on a test?

Everyone knows that the letter “F” on a test means you failed. But have you ever wondered why the scores go “A,” “B,” “C,” “D,” and then skip “E” and go straight to “F”? Turns out, in the earliest record of a letter-grade system, which was implemented at Mount Holyoke College in Massachusetts in 1897, an “E” used to mean you failed. But just one year later, it was changed to an “F.” That’s because some professors worried that students would think “E” stood for excellent, whereas “F” more clearly meant “fail.”



Photo by Hello I’m Nik

Why is the circular ride at fairs called a “Ferris Wheel?”

The Eiffel tower was a huge success at the 1889 World’s fair in Paris. When the 1893 World’s fair was announced to be in Chicago, planners wanted something to rival the Eiffel tower. There were many proposals including a tower garlanded with rails to distant cities, enabling visitors to toboggan home; another tower from whose top guests would be pushed off in cars attached to thick rubber bands, a forerunner of bungee jumping. Eiffel himself proposed an idea: a bigger tower. One of the planners, George Washington Gale Ferris Jr., a 33-year-old engineer from Pittsburgh whose company was charged with inspecting the steel used by the fair, was struck by a brainstorm and quickly sketched a huge revolving steel wheel. Ferris was hardly the first to imagine such a wheel. In fact, a carpenter named William Somers was building 50-foot wooden wheels at Asbury Park, Atlantic City and Coney Island; a roundabout, he called it, and he’d even patented his design. But Ferris had not only been challenged to think big; the huge attendance expected at the fair inspired him to bet

big. He spent \$25,000 of his own money on safety studies, hired more engineers, recruited investors. On December 16, 1892, his wheel was chosen to answer Eiffel. It measured 250 feet in diameter, and carried 36 cars, each capable of holding 60 people. More than 100,000 parts went into Ferris’ wheel, notably an 89,320-pound axle that had to be hoisted onto two towers 140 feet in the air. Launched on June 21, 1893, it was a glorious success. Over the next 19 weeks, more than 1.4 million people paid 50 cents for a 20-



Photo by Raynaldy Dachlan

minute ride and access to an aerial panorama few had ever beheld. “It is an indescribable sensation,” wrote a reporter named Robert Graves, “that of revolving through such a vast orbit in a bird cage.” But when the fair gates closed, Ferris became immersed in a tangle of wheel-related lawsuits about debts he owed suppliers and that the fair owed him. In 1896, bankrupt and suffering from typhoid fever, he died at age 37. A wrecking company bought the wheel and sold it to the 1904 Louisiana Purchase Exposition in St. Louis. Two years later, it was dynamited into scrap. So died the one and only official Ferris Wheel. But the invention lives on, inspired by the pleasure Ferris made possible.

Why do crickets chirp?

I initially wanted to know scientifically why crickets are so loud, but it turns out they just are. A typical field cricket chirping sounds can reach 100 decibels. For comparison, a car's horn reaches about 110 decibels. That's all well and good until a cricket or two gets into your house. Then the search for the evil creatures are on. Just like humans, crickets are omnivorous. Cat and dog food are a delicious treat for them. Crickets eat an array of things including drapes, clothing, and furniture. They have such strong jaws and teeth that they can chew through plastic bags, cardboard, and stored grains as well as cereals. It gets worse. They can bite you. Crickets do carry a significant number of diseases which, although having the ability to cause painful sores, are not fatal to humans. These numerous diseases can be spread through their bite, physical contact or their feces. But to answer the question, crickets chirp out of love and anger. There's chirping for attracting females from afar, another for close-up courtship, and even a triumphal after-mating song. Crickets also sing to intimidate rival males, and some of a male's more romantic tunes may trigger nearby females to fight each other. There's a persistent myth that crickets

rub their legs together to make sound. In fact, they sing with their wings. Run your finger down the teeth of a comb and you'll hear an almost musical rattle. Crickets make sound in a similar way. They rub a scraping organ on one wing against a comb-like organ on the other. Despite the bad rap I have

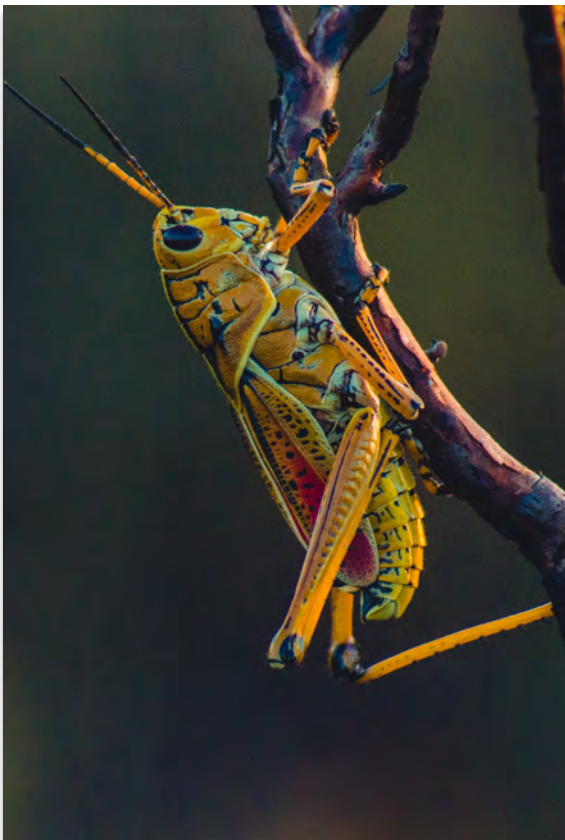


Photo by Gouthaman Raveendran

given them, many cultures adore crickets. Chinese people keep them as good luck charms, Japan loves their musical songs, and in Brazil, some species are considered to be signs of hope or incoming wealth (though others are thought to be omens of illness and death). And who could forget Disney's Jiminy Cricket, and Cri-Kee from Mulan? Few other insects have received the cute Disney treatment. And you can eat them.

Quick Facts:

- ⇒ The duffle (sometimes spelled duffel) bag gets its name from the town of Duffel, Belgium, where the cloth used in the bags was originally sold in the 1600's. The fabric was a coarse, thick woolen cloth that was originally used to repair ship sails. It's been suggested that the bags were made out of scraps for sailors and explorers on their way out to sea.
- ⇒ The Eiffel Tower was going to be demolished in 1909, but was saved because it was repurposed as a giant radio antenna.
- ⇒ Blackberries and raspberries are among a class of fruits called "bramble fruits," or fruits that are produced by any rough, tangled, prickly shrub. Bramble fruits are aggregate fruits, meaning they're made up of a bunch of smaller units. And those units—the little tiny bumps you see on these berries—are called drupelets.
- ⇒ When Gustave Eiffel designed the tower which bears his name, he added a hidden apartment on the third level of the landmark—but he never lived there, no one did. Instead, Eiffel used the special space to entertain distinguished guests such as Thomas Edison. Although it wasn't big, the apartment was decorated with wallpaper, furnished with wooden cabinets, and even featured a grand piano. These days, you can get a peek at the unique abode through a window if you purchase a ticket for a ride up the tower.
- ⇒ "SWIMS" is still "SWIMS" when turned upside down. Go on, flip whatever device you're reading this on upside down (except of course your PC). Or even try writing the word out yourself. If you use all uppercase letters (and write them properly instead of scrawling them out in some indecipherable text) you'll find the same word whether you're looking at it right-side up or upside down.
- ⇒ The 50 states of America come in all shapes and sizes, which means that some are bigger than others. Actually, some are a lot bigger than others. For instance, Alaska is not only one-fifth the size of the lower 48 states and larger than Texas, California, and Montana combined, but you could also fit Rhode Island into Alaska a whopping 425 times, according to the state's official state website.
- ⇒ If you tried a new variety of apple every day, it would take more than 20 years to try them all.
- ⇒ The Old Farmer's Almanac says that you count the number of cricket chirps in 14 seconds and add 40 to get the temperature in Fahrenheit.

Send your thoughts to drmjw@aol.com



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Addressing the Need for More Trained

Surveyors *By Chris Yonushewski, Business Development & Marketing
Manager, R&R Engineers – Surveyors, Inc. **

Within many areas of commercial development, a large number of vacant jobs go unfilled due to a small qualified labor pool.

In 2016, the U.S. Bureau of Labor and Statistics reported that of the approximately 65,000 land surveyors in the country, only 9,000 were under age 34. The average age for a land surveyor in the U.S. is inching towards 60, with many retiring in the coming decade. With a surge in construction and land development, R&R Engineers – Surveyors, Inc. — a Denver-based, full-service land surveying and civil engineering firm — made it a priority to identify and train the next generation of surveyors to keep up with demand.

Many new hires have little to no industry experience. The first step is a day of orientation, which includes typical on-boarding, safety training and protocols. They are paired up with a veteran crew chief whom they train with over the next six months. In our intern program, both survey-focus and engineering-focus interns spend a minimum of a week in the field. Job site experience goes beyond surveying and is just as important for our engineers.

For new surveyors, the first month's focus is learning how to use the equipment. This entails proper setup, steps to data collection, and site checks. They learn how to define points and put stakes in the ground. Additionally, new instrument operators confirm that field trucks have supplies and are set for that day's job.

At three months, new hires are qualified rookies and are performing in an instrument operator role for data collection, site checks, and field staking. Their survey crew chief has walked through dozens of job site examples and repetitions. These rookies now have an understanding beyond just what has to be done, but why it has to be done in this order.

"Field experience is everything. There is no better training than to see how it gets built and being onsite; not just data pushing and understanding the equipment." – Andy Maggiore (Survey Project Manager)

It is important to understand both the what, and the why, in the process. They need to understand why the instrument does what it does in order to provide quality control and foresee site conflicts.

By six months, those "rookies" aren't really rookies anymore. They switch from their veteran crew chief to regular rotation within the survey department to learn a variety of skills across survey crews.

"Any given survey task could have ten different ways to do it, and across our field crews people do tasks differently. You ask the same questions to five crew chiefs and you'll probably get five different answers. The benefit in this diversity is to hone-in on the most efficient and effective method and share that with the entire team," said Tony Smith, president of R&R.

By working with different survey crew chiefs, it bridges gaps and builds relationships across the department. We don't work in silos or competing teams, so there is an increased friendship and knowledge of coworkers. They know who has expertise in certain subjects and who to call when they need advice.

This is not a continuous improvement program; this is training and career pathing. Once proficient in the role, those having shown willingness to learn are given autonomy and opportunities for junior management, office drafting, or preparing take-off packages. Typically, the first day for a junior crew chief includes 10 or 12 check-in phone calls with questions and clarifications, which quickly drops once they gain experience.

"Small mistakes are learning opportunities, not job pitfalls. Given the chance, our promising field staff takes responsibility and learns from their actions," says Jeff Weygandt, senior survey project manager.

Most new hires and emerging surveyors start in construction, but a great benefit of R&R is the diversity of survey projects we undertake. Our field and office drafting staff are exposed to a variety of surveys including boundary, platting, condo maps, topography, site features, utility locates, well monitoring, section breakdowns, and construction staking. While some firms focus-in and specialize, R&R embraces opportunities in construction staking and other survey areas, which has now evolved to nearly doubling our field crews/trucks over the last five years.

People learn differently. We cannot cater to everyone's learning style, but we can train with a variety of styles repeatedly. The repetition, especially in the field, is a key to retaining their understanding. But repetition can be difficult with the variety of projects and the long duration of construction projects (sometimes taking years). The duration for proficient instrument operators and crew chiefs takes years for the right field experience. By taking a long approach to our on-the-job training, with significant field experience and a thorough understanding of a construction project's life cycle, we are confident that our entry-level staff will have job security and career progression for years to come.

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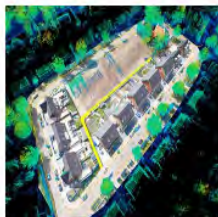
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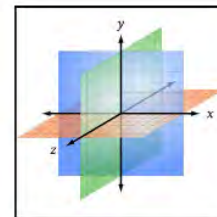
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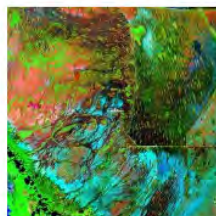
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donb@znseng.com

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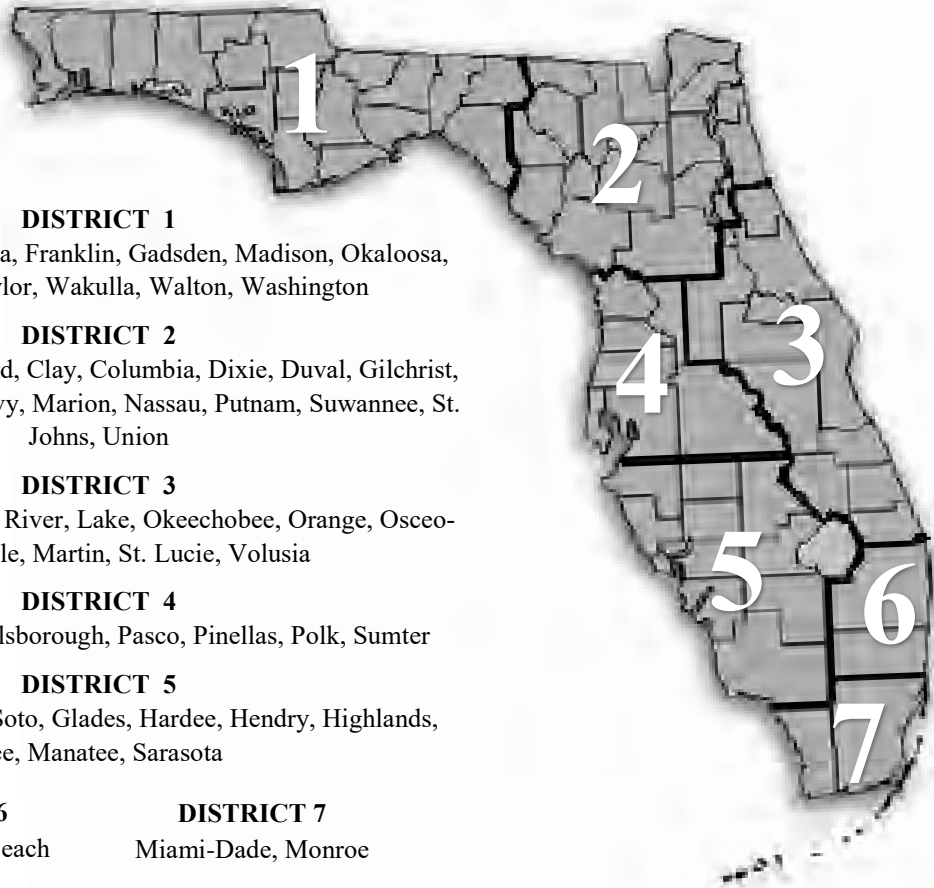
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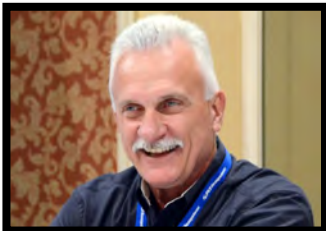
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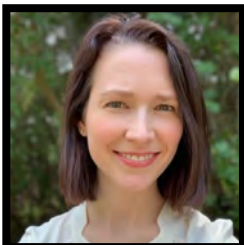
Executive Director
director@fsms.org

Rebecca Culverson



Education Director
education@fsms.org

Laura Levine



Communications Director
communications@fsms.org

Cathy Campanile



Regional Coordinator
seminolecc84@gmail.org

Tom's Tip of the Month



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.



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We want to feature you in next month's Florida Surveyor! Please send your Halloween or Autumn-themed photos to communications@fsms.org by November 3, 2019.

Photo: Laura Levine



2019 Sustaining Firms

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| Accuright Surveys of Orlando, Inc. | 407-894-6314 | CPH, Inc. | 407-322-6841 |
| Agnoli, Barber & Brundage, Inc. | 239-597-3111 | Craven-Thompson & Associates, Inc. | 954-739-6400 |
| AIM Engineering & Surveying, Inc. | 239-332-4569 | Cross Surveying, LLC | 941-748-8340 |
| Allen & Company, Inc. | 407-654-5355 | Culpepper & Terpening Inc. | 772-464-3537 |
| Allen Engineering, Inc. | 321-783-7443 | Cumbey & Fair, Inc. | 727-324-1070 |
| AM Engineering, Inc. | 941-377-9178 | Dagostino & Wood, Inc. | 239-352-6085 |
| American Consulting Professionals, LLC | 813-435-2600 | DeGrove Surveyors | 904-722-0400 |
| American Surveying, Inc. | 813-234-0103 | Dennis J. Leavy & Associates | 561-753-0650 |
| Amerritt, Inc. | 813-221-5200 | Dewberry | 321-354-9729 |
| Arc Surveying & Mapping, Inc. | 904-384-8377 | DMK Associates, Inc. | 941-475-6596 |
| Associated Land Surveying & Mapping, Inc. | 407-869-5002 | Donald W. McIntosh Associates, Inc. | 407-644-4068 |
| Avirom & Associates, Inc. | 561-392-2594 | Donoghue Construction Layout, LLC | 321-248-7979 |
| Axis Geospatial SE, LLC | 386-439-4848 | Douglass, Leavy & Associates, Inc. | 954-344-7994 |
| Banks Engineering | 239-939-5490 | DRMP, Inc. | 407-896-0594 |
| Barnes, Ferland and Associates, Inc | 407 896-8608 | DSW Surveying & Mapping, PLC | 352-735-3796 |
| Barraco & Associates, Inc. | 239-461-3170 | Durden Surveying and Mapping, Inc. | 904-853-6822 |
| Bartram Trail Surveying, Inc. | 904-284-2224 | E.F. Gaines Surveying Services, Inc. | 239-418-0126 |
| BBLS Surveyors, Inc. | 239-597-1315 | Echezabal & Associates, Inc. | 813-933-2505 |
| Bello & Bello Land Surveying Corporation | 305 251-9606 | ECHO UES, Inc. | 888-778-3246 |
| Benchmark Surveying & Land Planning, Inc. | 850-994-4882 | Eda Engineers-Surveyors-Planners, Inc. | 352-373-3541 |
| Berntsen International | 608-443-2773 | Eiland & Associates, Inc. | 904-272-1000 |
| Beta Company Surveying, Inc. | 941-751-6016 | Element Engineering Group, LLC | 813-386-2101 |
| Betsy Lindsay, Inc. | 772-286-5753 | Engenuity Group, Inc. | 561-655-1151 |
| Biscayne Engineering Company, Inc. | 305-324-7671 | Engineering Design & Construction, Inc. | 772-462-2455 |
| Boatwright and Durden Land Surveyors, Inc. | 904-241-8550 | England, Thims & Miller, Inc. | 904-642-8990 |
| Bock & Clark Corporation | 330-665-4821 | ER Brownell & Associates, Inc. | 305-860-3866 |
| Boundary & Mapping Associates, Inc. | 407-696-1155 | ESP Associates FL, Inc | 813-295-9024 |
| Bowman Consulting Group, Ltd. | 703-464-1000 | Exacta Land Surveyors, Inc. | 305-668-6169 |
| Brown & Phillips, Inc. | 561-615-3988 | F.R. Aleman & Associates, Inc. | 305-591-8777 |
| BSE Consultants, Inc. | 321-725-3674 | F.R.S. & Associates, Inc. | 561-478-7178 |
| Buchanan & Harper, Inc. | 850-763-7427 | First Choice Surveying, Inc. | 407-951-3425 |
| Bussen-Mayer Engineering Group, Inc. | 321-453-0010 | Florida Design Consultant, Inc. | 727-849-7588 |
| C&M Road Builders, Inc. | 941-758-1933 | Florida Engineering & Surveying, LLC | 941-485-3100 |
| Calvin, Giordano & Associates, Inc. | 954-921-7781 | FLT Geosystems | 954-763-5300 |
| Cardno, Inc. | 407-629-7144 | Fortin, Leavy, Skiles, Inc. | 305-653-4493 |
| Carter Associates, Inc. | 772-562-4191 | Geo Networking, Inc. | 407-549-5075 |
| Caulfield & Wheeler, Inc. | 561- 392-1991 | Geodata Consultants, Inc. | 407-732-6965 |
| Causseaux, Hewett & Walpole, Inc. | 352-331-1976 | Geoline Surveying, Inc. | 386-418-0500 |
| Chastain-Skillman, Inc. | 863-646-1402 | Geomatics Corporation | 904-824-3086 |
| CivilSurv Design Group, Inc. | 863-646-4771 | Geomni, Inc. | 904-758-2601 |
| Clary & Associates, Inc. | 904-260-2703 | GeoPoint Surveying, Inc. | 813-248-8888 |
| Clements Surveying, Inc. | 941-729-6690 | George F. Young, Inc. | 727-822-4317 |
| Coastal Supply, Inc. | 321-345-4051 | Geosurv, LLC | 877-407-3734 |
| Collins Survey Consulting, LLC | 863-937-9052 | Germaine Surveying, Inc. | 863-385-6856 |
| Compass Engineering & Surveying, Inc. | 727-822-4151 | Global One Survey, LLC | 786-486-8088 |
| Control Point Associates FL, LLC | 908-668-0099 | GPI Geospatial, Inc. | 407-851-7880 |
| County Wide Surveying, Inc. | 850-769-0345 | GPServ, Inc. | 407-601-5816 |
| Cousins Surveyors & Associates, Inc. | 954-689-7766 | Gustin, Cothorn & Tucker, Inc. | 850-678-5141 |
| | | H. L. Bennett & Associates, Inc. | 863-675-8882 |

2019 Sustaining Firms

| | | | |
|--|--------------|--|--------------|
| Hamilton Engineering & Surveying, Inc. | 813-250-3535 | PEC - Surveying & Mapping, LLC | 407-542-4967 |
| Hanson Professional Services, Inc. | 217-788-2450 | Pennoni Associates, Inc. | 215-222-3000 |
| Hanson, Walter & Associates, Inc. | 407-847-9433 | Pickett & Associates, Inc | 863-533-9095 |
| Hole Montes, Inc. | 239-254-2000 | Pittman Glaze & Associates Inc | 850-434-6666 |
| Honeycutt & Associates, Inc. | 321-267-6233 | Platinum Surveying & Mapping, LLC | 863-904-4699 |
| Hutchinson, Moore & Rauch, LLC | 251-626-2626 | Point Break Surveying, LLC | 941-378-4797 |
| Hyatt Survey Services, Inc. | 941-748-4693 | Point to Point Land Surveyors, Inc. | 678-565-4440 |
| I.F. Rooks & Associates, LLC | 813-752-2113 | Polaris Associates, Inc. | 727-461-6113 |
| Inframap Corporation | 804-550-2937 | Porter Geographical Positioning & Surveying, Inc. | 863-853-1496 |
| John Ibarra & Associates, Inc. | 305-262-0400 | Pulice Land Surveyors, Inc. | 954-572-1777 |
| John Mella & Associates, Inc. | 813-232-9441 | Q Grady Minor & Associates, PA | 239-947-1144 |
| Johnston's Surveying, Inc. | 407-847-2179 | R. M. Barrineau & Associates, Inc. | 352-622-3133 |
| KCI Technologies, Inc. | 954-776-1616 | R.J. Rhodes Engineering, Inc. | 941-924-1600 |
| Keith and Associates, Inc. | 954-788-3400 | Reece & White Land Surveying, Inc. | 305-872-1348 |
| Kendrick Land Surveying | 863-533-4874 | Rhoden Land Surveying, Inc. | 352-394-6255 |
| King Engineering Associates, Inc. | 813-880-8881 | Rhodes & Rhodes Land Surveying, Inc. | 239-405-8166 |
| L&S Diversified, LLC | 407-681-3836 | Richard P. Clarson & Associates, Inc. | 904-396-2623 |
| Landmark Engineering & Surveying Corporation | 813-621-7841 | Robayna and Associates, Inc. | 305-823-9316 |
| Leading Edge Land Services, Inc. | 407-351-6730 | Robert M. Angas Associates, Inc. | 904-642-8550 |
| Leiter Perez & Associates, Inc. | 305-652-5133 | Rogers, Gunter, Vaughn Insurance, Inc. (HUB Florida) | 850-386-1111 |
| Lengemann | 352-669-2111 | S&ME, INC. | 407-975-1273 |
| Leo Mills & Associates, Inc. | 941-722-2460 | SAM Surveying and Mapping, LLC | 850.528.1005 |
| LidarUSA | 256-274-1616 | Sergio Redondo & Associates, Inc. | 305-378-4443 |
| Long Surveying, Inc. | 407-330-9717 | Settimio Consulting Services | 850-341-0507 |
| Ludovici & Orange Consulting Engineers, Inc. | 305-448-1600 | Shah Drotos & Associates, PA | 954-943-9433 |
| MacSurvey, Inc. | 727-725-3269 | Shannon Surveying, Inc. | 407-774-8372 |
| Manuel G. Vera & Associates, Inc. | 305-221-6210 | Sherco, Inc. | 863-453-4113 |
| Marco Surveying & Mapping, LLC | 239-389-0026 | Sliger & Associates, Inc. | 386-761-5385 |
| Maser Consulting, P.A. | 813-207-1061 | Southeastern Surveying & Mapping Corporation | 407-292-8580 |
| Massey-Richards Surveying & Mapping, LLC | 305-853-0066 | SGC Engineering, LLC. | 207-347-8100 |
| Masteller, Moler & Taylor, Inc. | 772-564-8050 | Stephen H. Gibbs Land Surveyors, Inc. | 954-923-7666 |
| McKim & Creed, Inc. | 919-233-8091 | Stoner & Associates, Inc. | 954-585-0997 |
| McLaughlin Engineering, Co. | 954-763-7611 | Strayer Surveying & Mapping, Inc. | 941-497-1290 |
| Metron Surveying and Mapping, LLC | 239-275-8575 | Suarez Surveying & Mapping, Inc. | 305-596-1799 |
| Metzger + Willard, Inc. | 813-977-6005 | Surv-Kap | 520-622-6011 |
| Mock Roos & Associates, Inc. | 561-683-3113 | SurvTech Solutions, Inc. | 813-621-4929 |
| Moore Bass Consulting, Inc. | 850-222-5678 | Thurman Roddenberry & Associates, Inc. | 850-962-2538 |
| Morris-Depew Associates, Inc. | 239-337-3993 | Tradewinds Surveying Services, LLC | 863-763-2887 |
| Murphy's Land Surveying, Inc. | 727-347-8740 | Tuck Mapping Solutions, Inc | 276-523-4669 |
| Navigation Electronics, Inc. | 337-237-1413 | Upham, Inc. | 386-672-9515 |
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Additional Information

Upcoming Events

2019 FSMS Charity Sporting Clay Shoot

October 5, 2019
Midway, FL

Board Meeting

January 29-30, 2019
Gainesville, FL

Past Presidents

| | | |
|-------------------------|-------------------------|------------------------|
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| H.O. Peters | William G. Wallace, Jr. | Jack Breed |
| Harry C. Schwebke | Robert W. Wigglesworth | 2000 |
| John P. Goggin | 1980 | Arthur A. Mastronicola |
| R.H. Jones | Ben P. Blackburn | Michael H. Maxwell |
| 1960 | William B. Thompson, II | John M. Clyatt |
| Hugh A. Binyon | John R. Gargis | David W. Schryver |
| Russell H. DeGrove | Robert A. Bannerman | Stephen M. Gordon |
| Perry C. McGriff | H. Bruce Durden | Richard G. Powell |
| Carl E. Johnson | Buell H. Harper | Michael J. Whitling |
| James A. Thigpenn, III | Jan L. Skipper | Robert W. Jackson, Jr. |
| Harold A. Schuler, Jr. | Steven M. Woods | Pablo Ferrari |
| Shields E. Clark | Stephen G. Vrabel | Steve Stinson |
| Maurice E. Berry II | W. Lamar Evers | 2010 |
| William C. Hart | 1990 | Dan Ferrans |
| Frank R. Schilling, Jr. | Joseph S. Boggs | Jeremiah Slaymaker |
| 1970 | Robert L. Graham | Ken Glass |
| William V. Keith | Nicholas D. Miller | Russell Hyatt |
| James M. King | Loren E. Mercer | Bill Rowe |
| Broward P. Davis | Kent Green | Dale Bradshaw |
| E.R. (Ed) Brownell | Robert D. Cross | Lou Campanile, Jr. |
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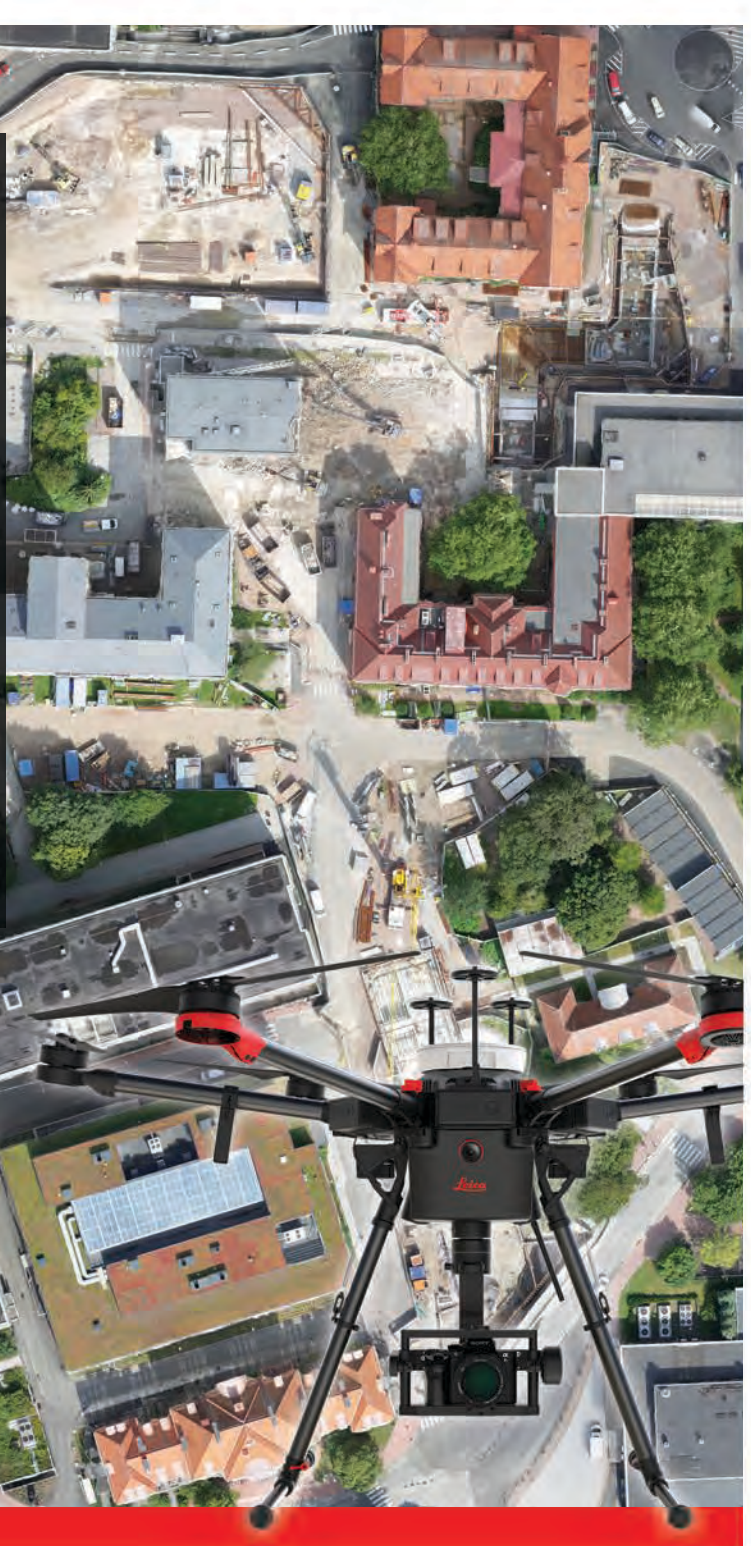
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