Congratulations and Welcome

EEI would like to recognize the following employees for their milestone anniversaries with the company:

5 Yrs: **Christopher R. Walton, P.E.**
Senior Project Engineer I

25 Yrs: **David R. Burroughs, P.E.**
Senior Vice President

EEI would like to congratulate the following employees:

- P.E. License ~ **Nadia L. Simek**
- CPII Certification ~ **Christopher J. Ott**
- Project Managers ~ **Colleen Jaltuch and John Hoffmann**

Welcome to our newest Project Engineers:

- **Luying Li, E.I.**, Civil Group
- **Anupama Mohanlal, E.I.**, Env. Group

Did You Know?

EEI has a new website that is up and running.

Check it out at:
www.eeiweb.com

Enterprises Trivia Challenge

Q: What is the estimated number of drones that will be in the sky by 2020?

Send your answer to **eei@eeiweb.com** or fax to **(630) 466-6701** by March 1st to be entered in a drawing for a $50 gift card!

Engineering Enterprises, Inc. (EEI), founded in 1974, is an award-winning consulting engineering firm providing services throughout northeastern Illinois. Our expertise includes water, wastewater, transportation, stormwater, construction management, land surveying, GIS and municipal consulting.

www.eeiweb.com

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In this Edition:

EEI's Eye in the Sky

Outstanding Service Every Client Every Day

Drones seem to be the latest, hippest technology craze out there. They seem to be everywhere, but do they bring any real value to the professional world or are they just a fun new gadget to impress or agitate the neighbor? What exactly can they do? Are there restrictions? There are certainly thousands of practical uses for drones across many industries. The focus here will be on professional drone services offered here at EEI, introduce the technology we currently use, give some sample drone projects, offer potential uses and touch on a few restrictions to keep in mind for safety and FAA compliance.

Introducing Seymour (See-More), EEI's first drone. Seymour is a DJI Phantom 4 Pro Quadcopter equipped with camera for HD photography and HD video. Seymour can be flown manually or a predetermined flight plan can be uploaded and automatically flown on-site using onboard GPS. Location accuracy can be enhanced by maintaining a wifi connection throughout the flight.

Fall / Winter 2018

Enterprises

EEI's Eye in the Sky, Cont'd.

Video

Seymour offers a variety of high quality video options. The output capability is 4K, however, most videos are flown in 1080p in order to maintain high resolution and provide a practical file size for viewing. The camera has a 90 degree gimbal angle so video can be taken at any angle from horizontal to straight down. Video can be taken during a manual flight, fly a pre-determined set of way points such as a corridor automatically or fly around and capture all sides of an object. Drone video is useful for many applications including up-close structure inspections such as water towers, transmission towers, buildings or bridges, investigation of waterway flow monitoring, natural occurrences such as erosion or flooding areas inaccessible by land, wildlife investigation and code compliance.

Top of Elevated Water Storage Tank

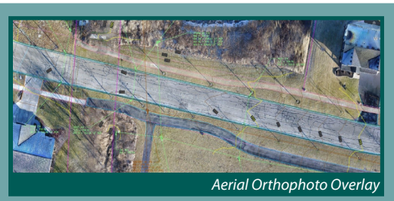
One notable use of the real-time video is in pre-planning a project. Taking a pre-flight of the proposed site can be beneficial. While planning a project, a drone video or photography can identify certain challenges and may offer valuable alternatives not visible on an old GIS aerial or from the ground. This can be a significant time and cost saver.

Pre-Flight of Proposed Site

Photography

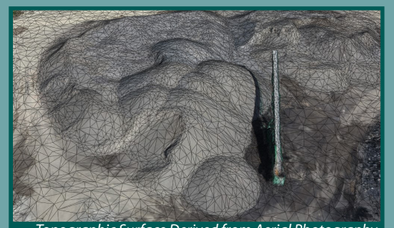
There are basically three options when it comes to aerial photography. First we can take single aerial photos of just about anything including structures, land features, waterways, roadways, industrial sites, wetlands, construction sites, vegetation, forests, lakes, flooded areas or potential development sites. Up-close HD inspection photography can be taken for structures such as water towers, transmission towers, bridges and buildings.

The second option is aerial mapping to create true scale Orthophotos. What is an Orthophoto? A composite aerial photograph of uniform scale throughout, derived from multiple aerial photographs taken of a given site. What does that mean? It means the drone goes up and flies a pre-determined flight path while collecting a multitude of overlapping photos of the site. The software then uses the overlap to remove the distortion along the edges. The final product is one overall true scale photograph which can be used as an accurate map of the earth's surface from which actual measurements can be made. Examples include project basemaps, concept plans, exhibits and existing site conditions.

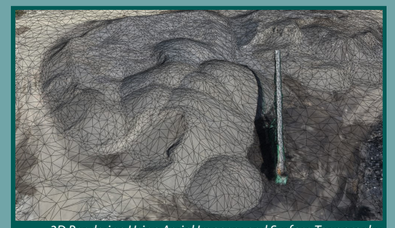


Aerial Orthophoto Overlay

A third use is topographic mapping volumetric surveys. This is photography based three-dimensional surface modeling. Simply put, the drone takes multiple photographs of a given area from several different directions. The software is able to stitch the photos together and create a surface model with elevation from which actual measurements can be made. The surface can then be used to generate elevation contours or three dimension renderings. Some useful applications of this include pre-planing topo data, volumetric surveys, stockpiles, and some design applications. Also, difficult areas that are inaccessible on foot could be mapped and investigated overhead.



Topographic Surface Derived from Aerial Photography



3D Rendering Using Aerial Imagery and Surface Topography

Considerations

There are several important things to consider when deciding if our professional drone services will be beneficial to you. First, we are UAS Remote Pilots licensed with the FAA for commercial applications. We have studied and understand the FAA laws and regulations such as airspace restrictions and maximum flight altitudes. Our pilots have professional training from licensed pilots. We have experience flying challenging projects. EEI maintains high quality drone hardware and software technology. Last but not least, the drone is one tool among many we utilize at EEI. We pride ourselves in offering superior products with real solutions at outstanding service. Please contact **Chris Peterson at cpeterson@eeiweb.com**, he is happy to answer any questions you may have about our drone program.

President's Message

Peter G. Wallers, P.E., CFM

Robots, Drones & Professional Judgement

In this newsletter, you will find an article on drones and some of their practical uses. It was not long ago that drones and robots were only heard of in science fiction books and movies. If you did not know, robotic total stations have been used in the surveying profession for some time. We have realized productivity increases and a reduction in the number of personnel required to perform various surveying tasks through the use of robotic total stations.

The use of drones within the survey process, or as a means to visualize projects from an aerial viewpoint, is the next step in the efficiency staircase. Drones allow us to be more productive, allow us to expand our project vision and allow us to observe things in a safer manner.

I am sure that there will be continued technological advancement, and we will find more and more uses for robots, drones and other means to increase efficiency in the future. The evolution of technology always has been a continuous and on-going process. When I started practice engineering, we used slide rulers (younger folks may need to Google this contraption) to solve complex problems, such as putting a man on the moon. Today, we use computer programs and/or specialized code to solve those problems far more efficiently.

Today's means are different and undoubtedly faster, but there is one ingredient that has always been needed as part of a solution recipe no matter how far our tools have evolved - professional judgement. Good tools are essential, but without know how and judgment, tools are not enough. Improvements in technology can get us to a point more efficiently, but eventually professional judgement needs to take over and find the most practical solution.

We, at EEI, continue to strive to utilize technology to find more efficient and better ways to serve our clients. We also believe our staff's professional judgement works in concert with our tools. We look forward to utilizing our drone and future technological advancements combined with our professional judgement to implement successful projects for our clients into the future.