



Fort Wayne ENGINEERS', Club

Engineers' News

May 2024

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www.FortWayneEngineersClub.org



Club News

May is the last tour of the year. The club is actively preparing for next year's events. Mark your calendar in advance for a 9/26/2024 tour of Bluffton's Valero ethanol biofuel plant.

Board meetings are changing to be held on Thursdays beginning on 8/22/2024.

The club is looking for a new Board member, which is mostly about monthly planning and tours. New faces are always welcome. Your time would consist of 2-3 hours monthly with as much flexibility as you need. Let us know at info@FortWayneEngineersClub.org if you're interested.

May Tour

EDP Renewables

Timber Road Wind Farm and Timber Road Solar Farm



When: May 23, 2024 @ 5:00 p.m.

Where: 9630 State Road 49, Payne OH 45880

[Timber Road Wind Farm | EDPR North America](#)

[Solar Farm Fact Sheet](#)

Special Requirements: All ages welcome (accompanied by a responsible adult if appropriate).

Career Building: Adults and students are highly welcomed on this tour who may find a career in this field. A few months back the FWEC toured Ivy Tech's Aviation Maintenance School where they highlighted their aviation airframe certificate that can also be applied to solar and wind turbine fields.

Details: The Timber Road Solar Park is located in Paulding County, northeast of the town of Payne. The solar park complements the area's agricultural resources.

Modern wind turbine generators are sophisticated, high-tech machines designed to capture the kinetic energy of the wind and convert it into electricity. A turbine's blades capture the wind and rotate an internal shaft connected to a gearbox spinning a generator to produce electricity.

Timber Road II Wind Farm consists of 55 Vestas V100 1.815 MW wind turbines, and Timber Road IV Wind Farm consists of 24 Vestas V150 4.2 MW wind turbines and 7 Vestas V136 3.6 MW. Timber Road III Wind Farm consists of 48 Gamesa G114 wind turbines. The Timber Road office also operates the 30 Vestas V110 turbines generating 66 MW out of Ada, OH.

The tour begins with a lecture in the conference room at the office of EDP Renewables, located north of Payne, Ohio. The lecture will cover both wind turbines and the solar field located south of the office. After the lecture we will be allowed to inspect the windmill turbine blades stored behind the office building, and if we get permission, we may be allowed to visit one of the wind turbines nearby. Anyone visiting the turbine must wear a hardhat, closed toe shoes preferably steel or composite toe, and clothing appropriate for the weather and outdoor environment. If you do not have a hard hat, loaners will be available, you may be asked to wait in your vehicle until a loaner is available.

April Tour Summary
FWPD Drone First Response (DFR) Team



(Drones not all pictured consist of Avata, Evo II 640T, Matrice 30T, Matrice 300, and Dragonfish)

This tour ended up showcasing the startling speed and scale of replacement cycles in technology, equipment, and procedures. The City of Fort Wayne somehow encourages various Departments to identify and pursue what are truly best physical and financial practices.

The Drone First Response (DFR) team, within the Fort Wayne Police Department (FWPD), became an identifiable initiative in 2016 with the advent of appropriate equipment training (classes in California) and finalized FAA Part 107 requirements (replacing ad hoc FAA procedures). Enormous improvements in equipment have resulted in roughly 69 drones purchased over time (some now retired) and another 8-12 under discussion. The DFR is not some isolated group but 9-12 police officers integrated with other specialist teams, 911, our Fire Department, some interagency agreements statewide, and more. The scale of training and standard procedures required across public safety participants seemed almost implausible. It is one of the reasons that County property tax bills leaped this year to support full-time fire departments, replacing volunteer units. Availability and feasibility of volunteers had also plummeted locally and nationally.

FWPD drones were originally conceived to be first responders, often arriving at scenes of 911 calls literally 2-3 minutes before an initial ground vehicle could. Some 18% of drone flights in 2023 eliminated a physical need for response on the ground. Many others decide beforehand what vehicles and personnel are needed. Nearly immediate overviews of crash scenes or water emergencies can substantially hasten appropriate vehicles and personnel to optimal locations. Drones routinely assess traffic stalled by crashes or other incidents to prevent secondary crashes/incidents, which are proliferating. Drones have widely displaced helicopters in the U.S.

due to cost and speed of response. Helicopters excel in range and single-unit loitering time.

As needed, crash or crime scenes are documented by drone (linked to the “cloud”) with <1 inch accuracy and detail in a two-dimensional photo format which is easy to store, file, and preserve. This replaces hand-drawn style maps on paper, which required triple the time and labor. Hand-drawn could be unavailable in time or otherwise be problematic for court purposes. Depending on the amount of detail chosen (number and directions of drone passes), it may be possible to generate essentially walk-through body-camera-like video within hours of an incident.

Data collection for mapping purposes combines digital photography and modern conventional GPS surveying. A “real-time kinematic” or RTK pole (6’ 6” high) is erected on the ground, some numbered markers are laid flat on the ground as physical reference points, and a 30T drone flies an automatic grid or two relative to the pole. The drone and pole positions, and photo pixel data, are noted in relation to GPS satellites.

FAA regulations require someone visually monitoring the airspace for two miles around a drone to avoid mid-air collisions, unless within a building. Our police flights utilize geofencing and are also stratified by altitude to avoid ground and some in-air conflicts. Overall, drones do not inform their operators about surrounding conflicts. The two-mile FAA requirement often results in limited ability to legally fly at night, but air space restrictions within Fort Wayne often facilitate night work. These include FAA airport-area rules, a City of Fort Wayne ordinance explicitly tailored for DFR, and certain special event permits. Most FWPD drones have anti-collision lights and are fully operational within reasonable weather conditions.

Anyone operating a drone within Fort Wayne should be aware that it is legally an aircraft subject to www.fwpd.org/drone-ordinance, FWPD UAS Flight Notification Form, and FAA Part 107 rules (see the Recreational UAS Safety Test, or TRUST, at no cost online if using .gov sites). The notification form helps avoid personal liability and fines for flying in restricted airspaces.

All factors combined, drones have radically improved security for downtown festivals and events at effectively no additional cost, perhaps reducing cost, day and night. DFR has covered multiple events involving State, Federal, and local officials ranging from Mayor Henry to President Trump. Even our Mayor has faced serious death threats. During our tour, our faces and actions were readily recognizable in real time from a small drone (Matrice 30T) over a quarter mile away. These have been used to track explicit shoplifter or vehicle situations to avoid high-risk chases. Some larger and more cumbersome DFR drones would be able to read a license plate a half mile away. (Ed.: According to multiple other sources, more efficient ways have evolved to gather and process plate or cell phone info when needed. Indiana is only slowly allowing traffic cameras for specific circumstances. Billions of dollars in class action lawsuits occurred in other States using cameras to enhance revenues.)

FWPD drones are the same units legally available for sale on the open market. The greatest limitations of their drones are battery range, FAA 2-mile monitoring, and a max airspeed of 35 mph (limits upwind range). These are offset in part by coordinating DFR officers to monitor airspace, swap batteries, launch fresh or specialist drones, and receive expiring drones. Much is done from various rooftops as well as from supporting police SUVs.

FWRPD uses Chinese made DJI-brand drones, but substitutes independent U.S.-originated software and consciously tries to isolate various potential concerns. Our domestic drones are outright substantially inferior and 2-3 times the cost. Factors include reliability, flight endurance (battery technology), and sensor acuity. Heat sensors have radically improved in detail and sensitivity over time. DFR is seldom asked to search for people, but expressed surprise that hiding body heat has become almost impossible.

The small and easily handled DJI Avata (\$1200 with support case/batteries) readily navigates inside buildings. Battery endurance is 18 minutes or 8 miles. Our hosts were openly relieved at how effective and life saving it had been for all concerned during a standoff in Kendallville (interagency mutual support agreement). A mix of 10 drones served during the incident.

An Autel Evo II has reliability and range limitations but potent thermal imaging for missing person or vehicle searches.

The drones that dominate DFR work are DJI Matrice 30T units which were originally priced \$15,000 apiece, but are now \$10,000 in a carrying case with 4 batteries and integral charger. (Ed.: For comparison, ordinary FWRPD vehicles each have some \$80,000 in basic modifications, mandatory electronics, and software subscriptions. Drones appear to prolong useful life of vehicles, reduce personnel requirements, and likely save lives.) The 30T has limited endurance (15-35 minutes) but packs superb sensors into carrying case dimensions suitable for FWRPD vehicles. Its moderately-small size is just sufficient for a gimbal that can keep a camera steady almost regardless of its drone's movement. This readily collects the data for crash or crime reports. It can monitor a police dog.

The Matrice 300 is much bigger and bulkier due to batteries with much longer range, 40-45 minute loitering times, astonishingly clear optics even at 200x hybrid zoom, and options for either a second camera gimbal or claw to drop/grab payloads (max 5 lb.). Basic cost is \$12,000 with case and batteries, plus \$13,000 for camera & processing choices. It can be upgraded with a bigger battery, whose weight precludes the second gimbal or claw options.

Advantages of the DFR program steadily grew and City Council approved \$100,000 for an Autel brand Dragonfish in early 2023. It is about 6-foot long by 6-foot wingspan with pivoting wingtip props, much like the military Osprey aircraft, but still requires lots of space to take off. It provides prolonged wide-area overwatch for public events using multiple technologies which are increasingly needed now-a-days.

Technologies controlling flight were not extensively covered, but relatively complex. With lost contact(s), a drone hovers via its own GPS until reconnected. Without reconnection(s), designs would in theory either land at that position or return to a predetermined default landing point.

The near-term future appears to be each individual drone in a self contained weatherproof box/charging station, typically on rooftops such as fire stations, distributed around the City. Various sources of digital command and control would cause the box to open and the drone to deploy, presumably returning for recharging in the protective box.

We are very grateful "on many levels" to FWPD's Matt Rowland, Craig Walters, and PJ Smith. Their attitude and quality are part of what makes life different here.

Participation in club tours has been on a downward trend. The FWEC cannot sustain facilitating tours without active participation. We encourage any participation by attending tours or volunteering to help plan events surrounding the FWEC. We welcome feedback as well that may help improve the current situation. Send that feedback to Info@FortWayneEngineersClub.Org

Work at a great place? Make an interesting product? Want to share your business with a local group? Host a tour! It's a great opportunity to show your unique workplace! The FWEC board will help facilitate any requirements for attendance, safety gear, advance sign ups or clearances, date planning, newsletter announcements, etc..

Volunteer

Interested in hosting a tour?

Contact us today!

Host a Tour

Items of Note

FWEC member Rod Vargo is Chair of the 28 year-old and all-volunteer [Utility Advisory Group](#), which formally advises Fort Wayne City Utilities and often City Council. Your comments are welcome at rodvargo@comcast.net

General Club Info

Fort Wayne Engineers Club dues are \$0. Donations are welcome but strictly voluntary. In recent years, club funds have helped support Discover-E, the Regional Science and Engineering Fair, annual bridge building contests in schools, academic awards, networking events, mentoring, our website, and facilitating free tours.

Please see FortWayneEngineersClub.org, [LinkedIn](#), or [Facebook](#) for updates on current Club activities, other news, and past newsletters.

Those participating in activities or hosting tours through FWEC do so strictly at their own risk, including disease exposures. Participation in club events is voluntary, free, nonprofit, and solely for the benefit of participants and the community at large. Anyone with an interest may participate unless restrictions are specified for specific events, such as minimum age or

minimum safety attire.

FWEC Roster for FY2023-2024

President: Nathaniel Wisel

Vice President: *Open*

Secretary: Rod Vargo

Treasurer: John Magsam

First-year Board Members: Dave Gordon, Bert Spellman

Second-year Board Member: Ryan Stark, Ed Woodward

Third-year Board Member: Marna Renteria, Mike Magsam

Editor of Engineer News: Nathaniel Wisel

Membership and Contact Chair: *Open*

Northeast Indiana DiscoverE Chair: *Open*

Job posting and resumes listed

The club accepts both job openings from around the area, as well as resumes from those seeking employment. Please submit these to the following email address:

Info@FortWayneEngineersClub.org

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