

Queen Anne's County's Drone Program



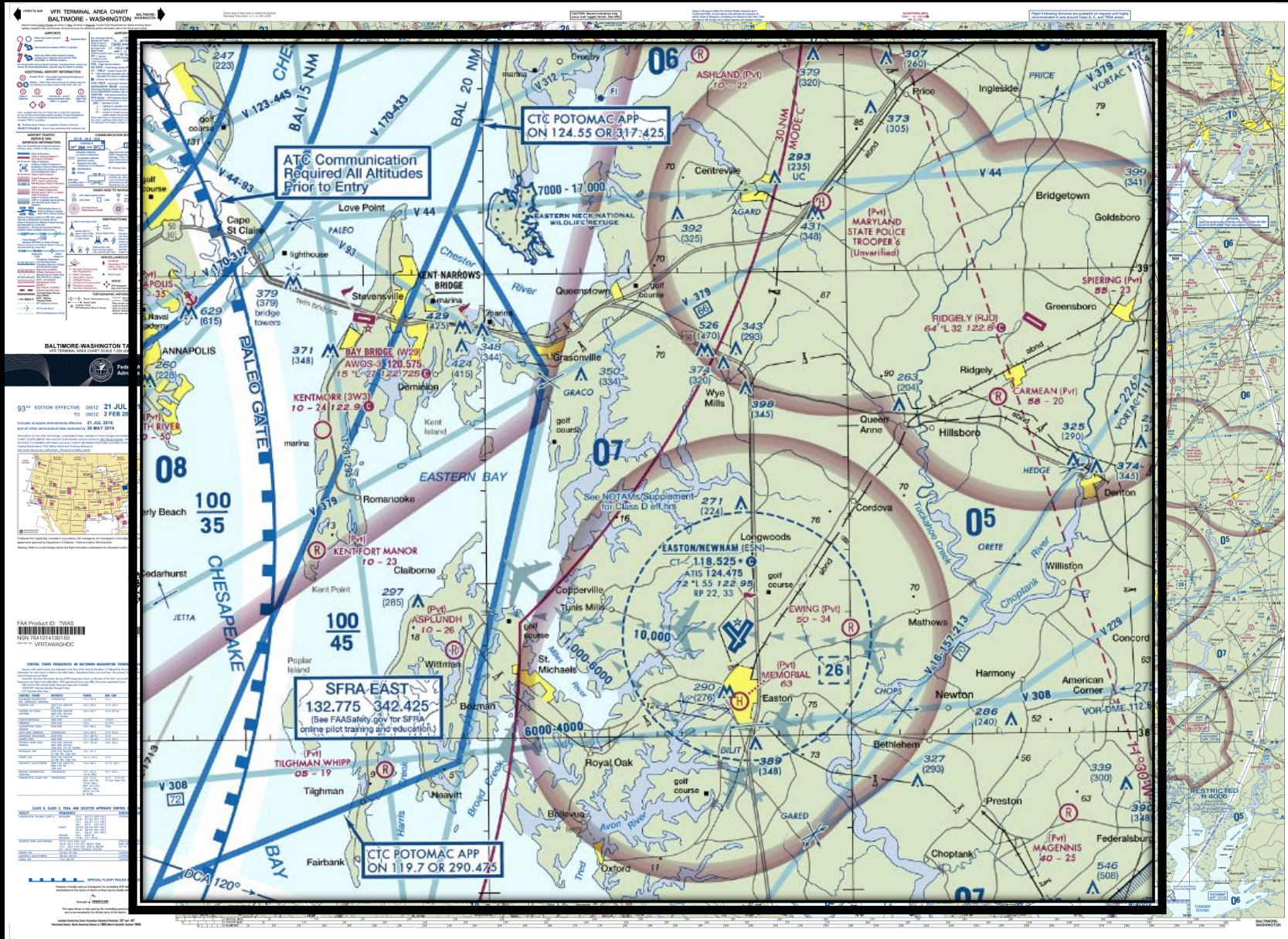
A local government approach to
drones



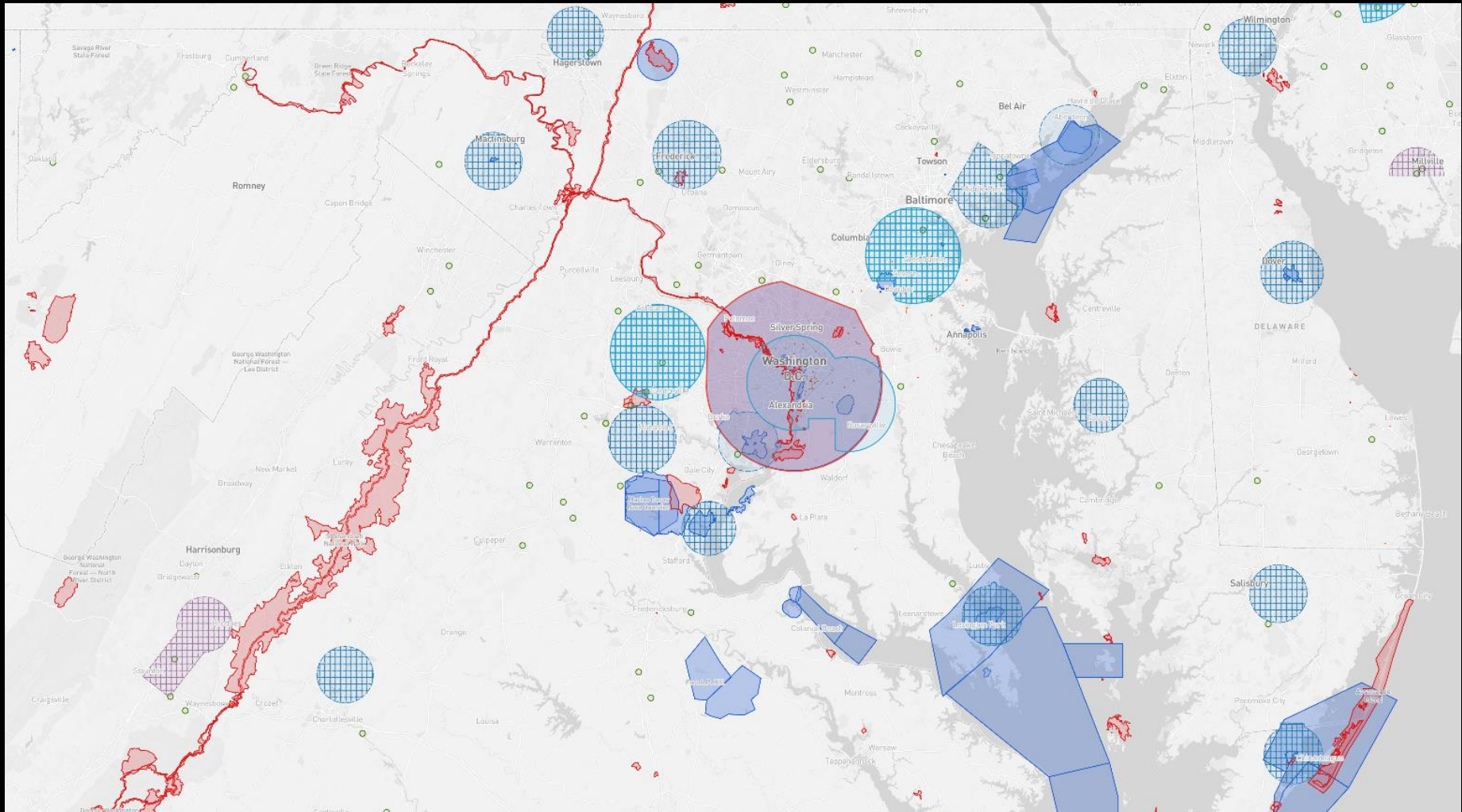
Why We Were Interested in the First Place



Baltimore-Washington VFR Terminal Area Chart



Maryland's National Airspace Under Part 107



Essential any where that is Red, Blue, or Purple is NOT good to fly without a waiver and/or further research

Source: Airmap. URL: <https://app.airmap.io/>

Bay Bridge Airport

Bay Bridge Airport Notification Area
Queen Anne's County

Queen Anne's County
Planned UAV Activity

Contacts

Sam Stanton - 443-340-

Tyler Pease - 410-490-

DATE: 02/14/2018

TIME: 1300 - 1600

ALTITUDE: SFC to 300' AGL



5 Mile Notification Zone

Our Initial Hurdles

- Researched Part 107 Requirements
 - Regulation seemed simple enough
 - Certification test seemed overwhelming
- Elected Official Buy-In would be crucial
 - Without it, even the best developed programs could be shut down
- Insurance would be a must
 - Our provider requirements to get coverage were intense
 - Required Operations/Maintenance/Training Manual & Part 107 Certification



Deciding to Hire Help



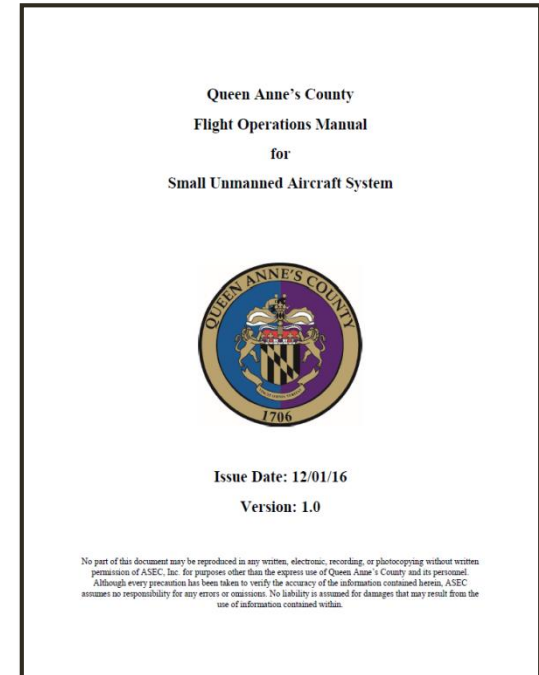
- Began test prep on our own
 - Using online resources
- Because of the hurdles we ultimately decided to hire help:
 - Aviation Systems Engineering Company (ASEC)
- ASEC provided test prep, hands-on drone training, and program/manual development, as well as initial insurance coverage application help
 - Hands on training spanned virtually all facets of Part 107 rules and regulations



Being Trained
to Fly for
Tower
Inspections

Drone “CYA” Manual

- Compiled all documentation into one place
 - Take this with us EVERY time we fly
- Includes:
 - Safety Brief/Operations Checklist
 - Operation Manual
 - Maintenance Manual
 - Training Manual
 - Quarterly Safety Training Updates
- Vital to demonstrate that we know what we are doing if we are ever questioned



Why Bother? Can't We Just Go Fly? – Insurance

- No technology is fool-proof – accidents happen
- As a government agency we were able to obtain insurance through the Local Government Insurance Trust (LGIT)
- Other options are available:
 - Verify - Hourly
 - SkyWatch – On Demand & Monthly options



Our Typical Set Up



Cones and chain provide a “sterile” cockpit, minimizing distractions during flight

Isn't it Expensive? – Hardware Requirements

- What we fly:
 - DJI Inspire 1 V2.0 – Purchased in 2016
 - Total package costs about \$3,500
 - Drone cost – about \$2,000
 - Additional costs for additional batteries, hard-shell case, extra remote-controllers, etc.
 - Requires a smartphone/tablet – not included
- This technology move fast!
 - Newer drones have better collision avoidance technology
 - Allows for more advanced software features
 - But older drones still get the job done!



Flight Control Options

- Manual Flight
 - DJI Go
- Automated Flight
 - DJI Ground Station Pro (iOS only)
 - DroneDeploy
 - Pix4D Mapper
 - Measure Ground Control
 - UgCS
- All automated flight options allow pilot to take control in the event of an emergency
- Find what's right for you! Other options are available



DJI GO



DroneDeploy



MEASURE



Data Processing



DroneDeploy

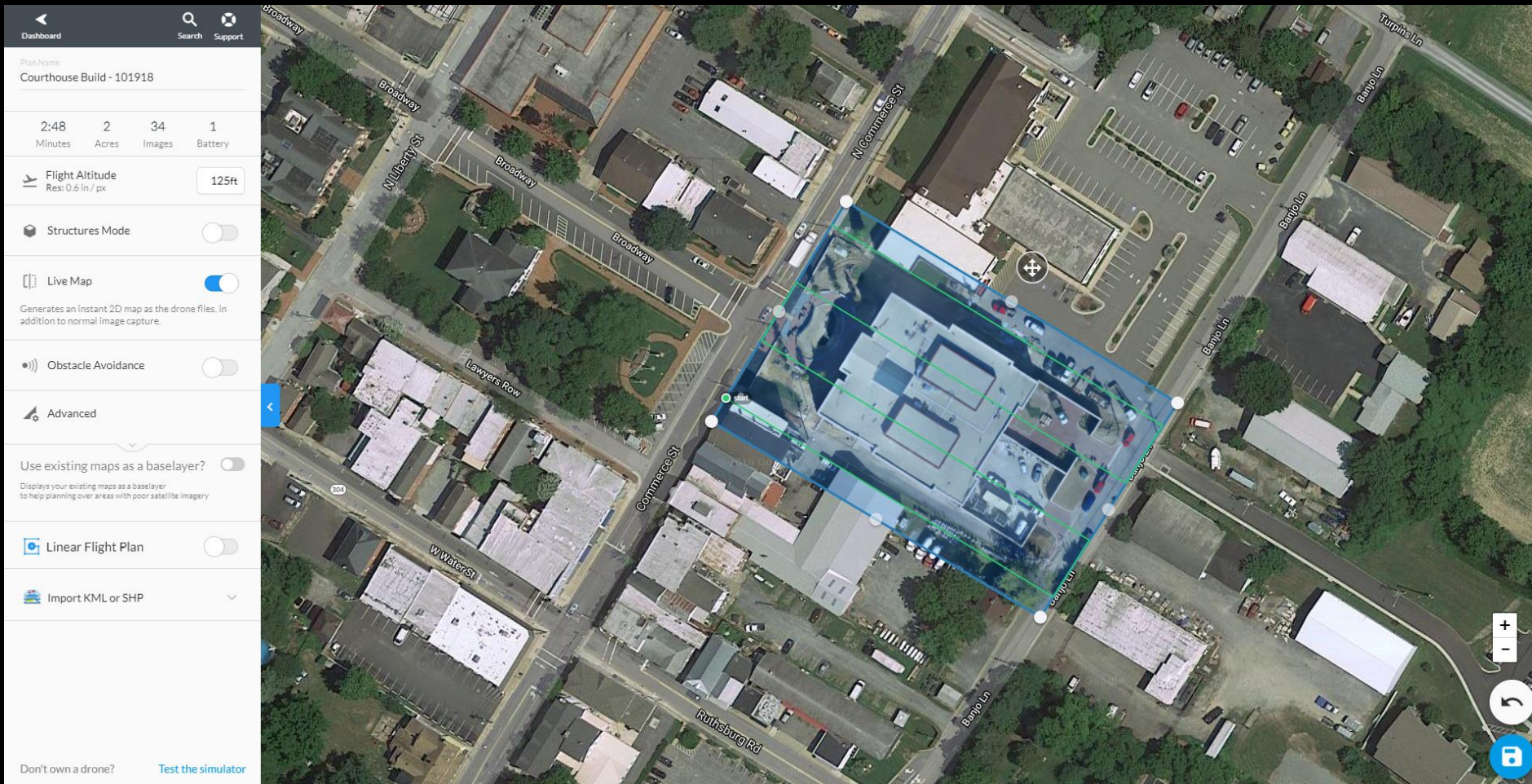
- Currently we use DroneDeploy for automated flight and cloud data processing
 - Creates both 2D and 3D output
 - Provides high quality resolution (up to 0.8in/pixel with the Pro tier) at low cost
 - Cloud based so additional PC resources are not required
 - Has worked great for us as we are starting out, however as we grow we may need to seek other solutions
- Luckily there are TONS of options



Current & Future Use Cases

- Current
 - Spot Aerial Imagery & 3D Modeling
 - Not trying to replace statewide orthomosaics
 - Construction Site Management
 - Sports field Management
 - Aerial Photography/Videography for Public Relations
 - Zoning/Critical Area Regulation Inspections
- Future
 - Storm water Management Inspections
 - Watershed Improvement Project Before/After Photos

DroneDeploy Flight Planning Interface



Available on Desktop and Mobile Devices
Mobile Device Required for actual Drone Use

Zoning/Critical Area Regulation Inspections



Flew drone over former Sand Mine Operation to determine the area of each mining pit.

Total Acreage Flown: 53.6 acres

Total Flight Time: 15 min

Analysis Turn Around: 24 hrs

Aerial Photography/Videography For Public Relations



Flew drone over directional drilling site for current sewer installation project

Construction Site Monitoring



Construction Site Monitoring

Grasonville Elementary S

Foreground Imagery: 09/21/17 Drone Imagery
Background Imagery: 2016 QAC Orthophotogr.



Grasonville Elementary S

Foreground Imagery: 11/15/17 Drone Imagery
Background Imagery: 2016 QAC Orthophotogr.



Grasonville Elementary S

Foreground Imagery: 01/10/18 Drone Imagery
Background Imagery: 2016 QAC Orthophotogr.



Grasonville Elementary School

Foreground Imagery: 01/26/18 Drone Imagery
Background Imagery: 2016 QAC Orthophotography



Construction Site Monitoring



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FOR SANITARY, STORM AND WATER SYSTEM MAINTENANCE PROFESSIONALS

August 2017

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STEP BY STEP

Queen Anne's County is using a different approach to wastewater collections to better serve rural residents and protect the Chesapeake Bay

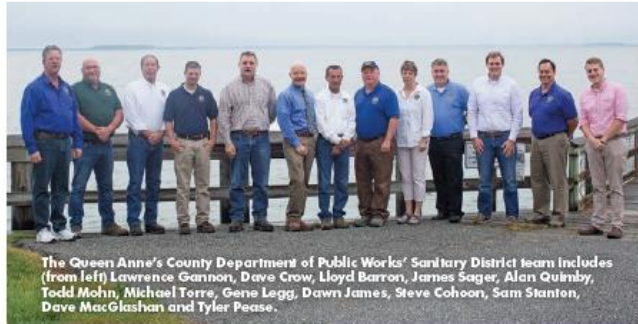
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Todd Mohn,
Director of Public Works
Queen Anne's County, Maryland

TECH CLOSE

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TECH TALK: W
IS PROVIDI



The Queen Anne's County Department of Public Works' Sanitary District team includes (from left) Lawrence Gannon, Dave Crow, Lloyd Barron, James Sager, Alan Quimby, Todd Mohn, Michael Torre, Gene Legg, Dawn James, Steve Cohoon, Sam Stanton, Dave MacGlashan and Tyler Pearce.

DRONE RANGERS

Todd Mohn recently sought the shade of a tree and heard a buzzing above his head.

"I thought it might be bees," he says. "But 10 feet above my head, I saw our drone."

Mohn is director of the Department of Public Works in Queen Anne's County, Maryland. The department likes to stay on top of current technology, but this latest purchase — a pair of camera-equipped drones — has put the technology on top of the county. The drones were purchased from Aerial Media Pros for joint use by the county's IT department and QACTV, the county's public video network. Aviation Company ASEC Inc. provided operator training and helped to establish the county's drone program.

The Federal Aviation Administration once required organizations operating a drone to keep a licensed pilot on staff, but regulations passed in summer 2016 relaxed those requirements and allowed staff to operate a drone after obtaining a Remote Pilot Certificate with a Small Unmanned Aircraft Systems (sUAS) endorsement.

Two GIS staff members have completed drone certification and typically fly the units 30 to 40 feet above the ground while collecting information that's incorporated into the county's digital asset maps using ArcGIS by Esri. Cloud-based software, Drone Deploy, is used for flight control and imagery processing.

"We've had drones for about a half-year, but they've already proved very useful, particularly on our South Kent Island sewer expansion project," Mohn says. "We've used them for surveying and mapping and to get photographic records of as-builts and open trenches. We've also used them to locate and map division valves, collection points, valve pits and fire hydrants. We're incorporating all of this into our GIS system."

Aerial photography is not only valuable to the DPW — photos are also used to keep residents informed of key construction milestones. For example, recent photos of directional drilling on the SKI project were uploaded to Facebook.

"Everyone's eager to think of new uses for the technology," Mohn says.



A drone view of a work site on Kent Island where new wastewater lines are being installed.

homeowner is inconvenienced. The pumps last a minimum of 20 years and cost about \$500 apiece, so they're relatively cheap to switch out."

Audible alarms will sound if the system fails or if a float reaches a high-level mark. At that point, DFW crews are dispatched to repair the system and pump out the tank. Mohn says a typical tank would need to be pumped out an average of every five to seven years using a standard vacuum truck.

Expensive lots

Limiting the number of installations was essential to getting the project built.

"Infill was the gorilla in the room," Mohn says. "Our objective was to provide a permanent solution and correct the environmental problems created by the existing homes affordably. We had 1,500 houses in the proposed service area, but 1,600 additional infill vacant lots could build with a sewer extension. We were constrained by a state law that required a new sewer system to connect to all properties, even vacant lots, if the collections system passed in front of the vacant lot. We weren't ready to extend sewer lines down streets that existed only on paper, so these larger blocks of vacant lots were strategically excluded from the defined service area."

Many infill lots were as small as 5,000 square feet. In 2013, the county drafted an ordinance that required adjacent lots under common ownership to be merged. This provided a means to achieve current land use and zoning regulations and limit new infill development. The county assumed the costs of lot mergers under a streamlined legal process.

"We became the poster child for the new law. With state funding, we were able to offer the system to existing resident homeowners at less than \$100 per month over a 20-year term."

— Todd Mohn

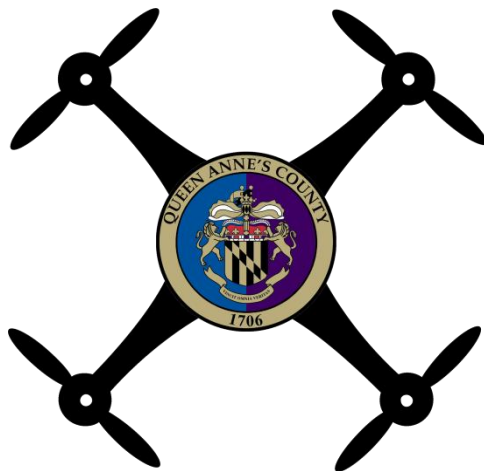


Imagery



Most importantly – SELFIES!!





Any Questions?

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