

Government & Public Safety sUAS Commercial Pilot Program



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Participants

- ▶ Boone County Government
- ▶ Boone County Fire Protection District / Missouri Task Force 1
- ▶ Boone Electric Cooperative
- ▶ Missouri SEMA



Primary Missions

- ▶ Boone Fire Protection District / Mo Task Force 1
 - ▶ Urban Search & Rescue*
 - ▶ Swiftwater Rescue*
 - ▶ Helicopter Search & Rescue*
 - ▶ Situation Assessment Team ◀ sUAS, GPS, & GIS
- ▶ Boone County
 - ▶ Project Specific 2D & 3D Imagery and Topo
 - ▶ Disaster Planning and Response
 - ▶ Crime & Accident Scene Reconstruction, Crowd Monitoring, Search & Rescue, and SWAT
 - ▶ Real Estate and Personal Property Tax Assessment
- ▶ Boone Electric Cooperative
 - ▶ Asset Inspections
 - ▶ Vegetation Management

Missouri Army National Guard

- ▶ UH-72A Lakota helicopter - S&S Mission Equipment Package (MEP)
 - ▶ Turreted Electro-optical/Infrared Sensor & Laser Pointer
 - ▶ 30-million-candlepower searchlight







sUAS Local History



FAA grounds journalism school drones at MU and Nebraska

HIGHLIGHTS
Researchers were using the airborne robots to shoot aerial photos and video from difficult-to-reach news scenes, but the Federal Aviation Administration said they must stop flying outdoors until they obtain government permission.

COLUMBIA — The Federal Aviation Administration has temporarily grounded newsgathering drones used by the journalism schools in Missouri and Nebraska.
Researchers at the University of Missouri and the University of Nebraska-Lincoln were using the airborne robots to shoot aerial photos and video from difficult-to-reach news scenes.
The Columbia Daily Tribune reported Thursday that the



Ashland looks to regulate drones

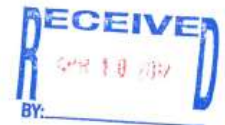
MAGGIE STANWOOD Nov 30, 2015

MORE INFORMATION

Ashland passes new drone rules
The town board anticipates soaring popularity of the devices.

COLUMBIA — A popular gift hitting the shelves this holiday season might be the next fly to swat for local governments across the United States.

The Ashland Board of Aldermen is attempting to be a step ahead by regulating model aircraft drones, which can be



March 31, 2017

Hello community leader!

You are cordially invited and highly encouraged to attend an informational meeting to learn about new state-of-the-art news gathering technology that KRCG-TV will be implementing in our area very soon. KRCG 13 is thrilled to announce we have invested in a UAV (unmanned aerial vehicle), more commonly referred to as a drone. We've also invested in extensive training and FAA certification for two of our employees as licensed pilots for the aircraft. The drone will be equipped with the latest generation HDTV miniature camera lens with the ability to cover live and taped news events.

The purpose of our meeting is to provide local law enforcement, emergency services, government officials and other community public safety leaders with an understanding of our approach to safely and responsibly deploying this technology, and how and when we plan to use it. Above all else, public safety is our utmost priority. We will have our company's lead FAA certified UAV pilot presenting our plan and he will be available to answer your questions.

We wanted to offer you a proper introduction and clear understanding of our UAV program, which we plan to roll out in our area this month.

Please plan to attend this important meeting:

Agreed to Standardize

- ▶ DJI as sUAS
- ▶ 2-Day FAA Part 107 Prep Training
- ▶ Jointly Develop Flight Skills Training
- ▶ Standard Operating Procedures
- ▶ Pix4D Capture and ESRI Drone2Map for Processing

Flying for Work or Business (non-recreational)

- ▶ Phase 1 - Part 107 - FAA Remote Pilots Exam
 - ▶ Waivers for Nighttime Missions
 - ▶ Controlled Airspace
 - ▶ Fly Over People
- ▶ Phase 2 - Section 333 Exemption - Certificate of Authorization (COA)
 - ▶ Blanket
 - ▶ Jurisdictional



Public Safety Training Course



Remote Pilot Test Prep

METAR: KCOU 011954Z 01007KT 10SM CLR
25/12 A3007 RMK AO2 SLP175 T02500122

AREAS ON THE TESTS

- Applicable regulations, limitations, and flight operation
- Airspace classification, operating requirements, and flight restrictions affecting small unmanned aircraft operation
- Aviation weather sources and effects of weather on small unmanned aircraft performance
- Small unmanned aircraft loading
- Emergency procedures
- Crew resource management
- Radio communication procedures
- Determining the performance of small unmanned aircraft
- Physiological effects of drugs and alcohol
- Aeronautical decision-making and judgment
- Airport operations
- Maintenance and preflight inspection procedures





Standard Operating Procedures

- ▶ Pre and Post Flight Checklists
- ▶ Skills Training
 - ▶ Basic-to-Advanced
 - ▶ Manual and Autonomous
 - ▶ Mission Specific
- ▶ 3-Months Flight Skills Currency Requirement
- ▶ Owner/Occupant Permission
- ▶ Conspicuous Onsite Notice

sUAV Pilot Checklist

UAV No.: _____

Name: _____ Date: _____ Time: _____/_____/_____

- ☐ Check GPS Signal
- ☐ Check Camera Settings

sUAV Pilot Checklist

UAV No.: _____

Name: _____ Date: _____ Time: _____/_____/_____

Mission Pre-Flight Checklist

Evaluation of Operating Environment and Landing Zone Set Up

- ☐ Perform Risk Assessment
- ☐ Verify Airspace: _____
- ☐ Weather: _____
- ☐ NOTAMS
- ☐ Brief All N
- ☐ Set Sterile

UAV Prep

- ☐ Batteries
- ☐ Unfold Fr
- ☐ Unfold Re
- ☐ Unfold Al
- ☐ Ensure W

Task VI: Loss of Visual Line of Sight

Objective: Gain experience in determining UA position after losing visual line of sight with UA.
Method: With UA at a location at least 1000 feet laterally from ground station position, student will look away from UA and allow instructor to manipulate controls to change the UA location. Upon turning back and interpretation, v

Task VII: Disturbance

Objective: Gain experience in handling UA during operations.
Method: During engagement, student may en

Task VIII: Obstacle

Objective: Gain experience in handling UA during operations.
Method: At instruction device that can participant will e

Task IX: Camera

Objective: Gain experience in handling UA during operations.
Method: While at specific location various angles,

Flight Training Task Schedule

This flight training task schedule is used by the UA Student Pilot to develop the necessary skills to fly a UA. The student must demonstrate each task.

Before each flight the UA Student Pilot will evaluate the following:

- Airspace
- Training area boundaries
- Multiple aircraft separation boundaries
- Area hazards

Task I: Powering-on and Takeoff

Objective: Gain experience in powering-on and conducting takeoff with the UAS.
Method: Student will power on the UAS, confirm aircraft and systems are flight-ready and the power-on and propeller startup procedure. Once the aircraft is successfully powered on, the student will initiate a climb with the UA to 5 feet above the ground and allow the UA to hover in place.

Task II: Landing and Powering-off

Objective: Gain experience in landing the UA and powering down the UAS.
Method: Student will initiate a descent above the Launch and Recovery Zone, land the UA at the specified location, initiate the propeller shutdown procedure and power down the UAS.

Task III: Non-turning or Rotating Climbs and Descents

Objective: Gain experience in climbing and descending the UA without aircraft turns or rotations.
Method: With the UA in a stabilized hover, student will initiate a climb keeping the UA facing the same direction with no lateral movement to an altitude of 200 feet AGL. Upon reaching 200 feet AGL, student will initiate a descent to 5 feet AGL keeping the UA facing the same direction with lateral movement.

Task IV: Turning and Rotating Climbs and Descents

Objective: Gain experience in climbing and descending the UA while rotating and laterally moving the UA.
Method: With the UA in a stabilized hover, student will initiate a climb. As the UA climbs,

Date/Time: _____

sUAS Operator/Observer: _____

Data Products:

- ☐ Video
- ☐ Ortho
- ☐ Text
- ☐ Other: _____

Flight Purpose and Plan: _____

Permission granted for flight by: _____

Pre-Flight FAA and County Requirements

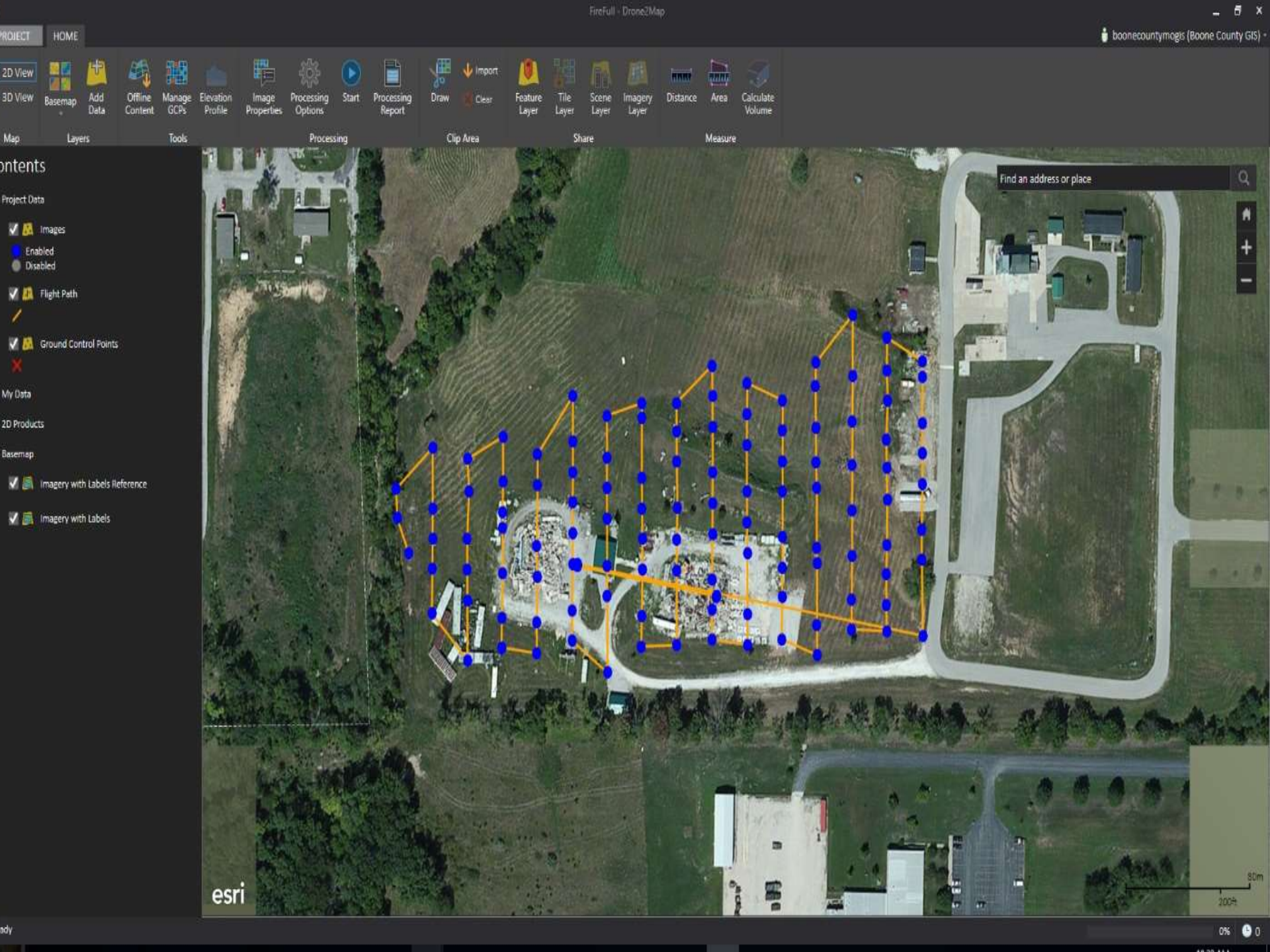
- ☐ Permission form has been completed
- ☐ Flight plan minimizes risk to the public
- ☐ Occupant has been briefed
- ☐ Conspicuous onsite notice
- ☐ Notify local FAA, life flight <http://knowbeforeyoufly.org>

Life Flight Dispatch

911/Dispatch

First 5 Minutes







3D Triangle Mesh from ~34,000,000 Colorized Point LAS Cloud





Boone County Fairgrounds

2.67" Resolution



1:1,700



1:130





Search Information Standardization Ad Hoc Work Group

GIS Response Vehicle

► Hardware

- Honda EU3000iS Generator & UPS Power
- DesignJet T120 24" Plotter
- LaserJet Multifunction 8.5"x11" Printer
- CradlePoint (Wifi/Satellite/Cell/LAN) Internet Access
- Mavic Pro sUAS (x4)
- iPad Mini Tablets (x12)
- Icom IC-A6 FAA Communications Radio (x2)
- Garmin GPSMAP 64st Handheld GPS (x25)
- GIS Server/Workstation & Dual Monitors
- GIS Mobile Laptop
- 37" HDTV with MicroPC - Map Viewer
- Tailgate Shelter Canopy
- Fire Extinguisher (x4)

► GIS Software

- Drone2Map (x2)
- ArcGIS Desktop Standard (x2)
- Collector for ArcGIS
- Portal for ArcGIS
- ArcGIS Server Workgroup
- Google Earth



County sUAS Go-Kit

- FAA Remote Pilot License
- sUAS backpack - Sun-hood, Tablet & Mount, Cables, SD Cards, Laptop, sUAS, and Controller
- Flight Checklists and Forms
- Citizen Alert Signage
- Fire Extinguisher
- GNSS for Ground Control
- Bear Spray?



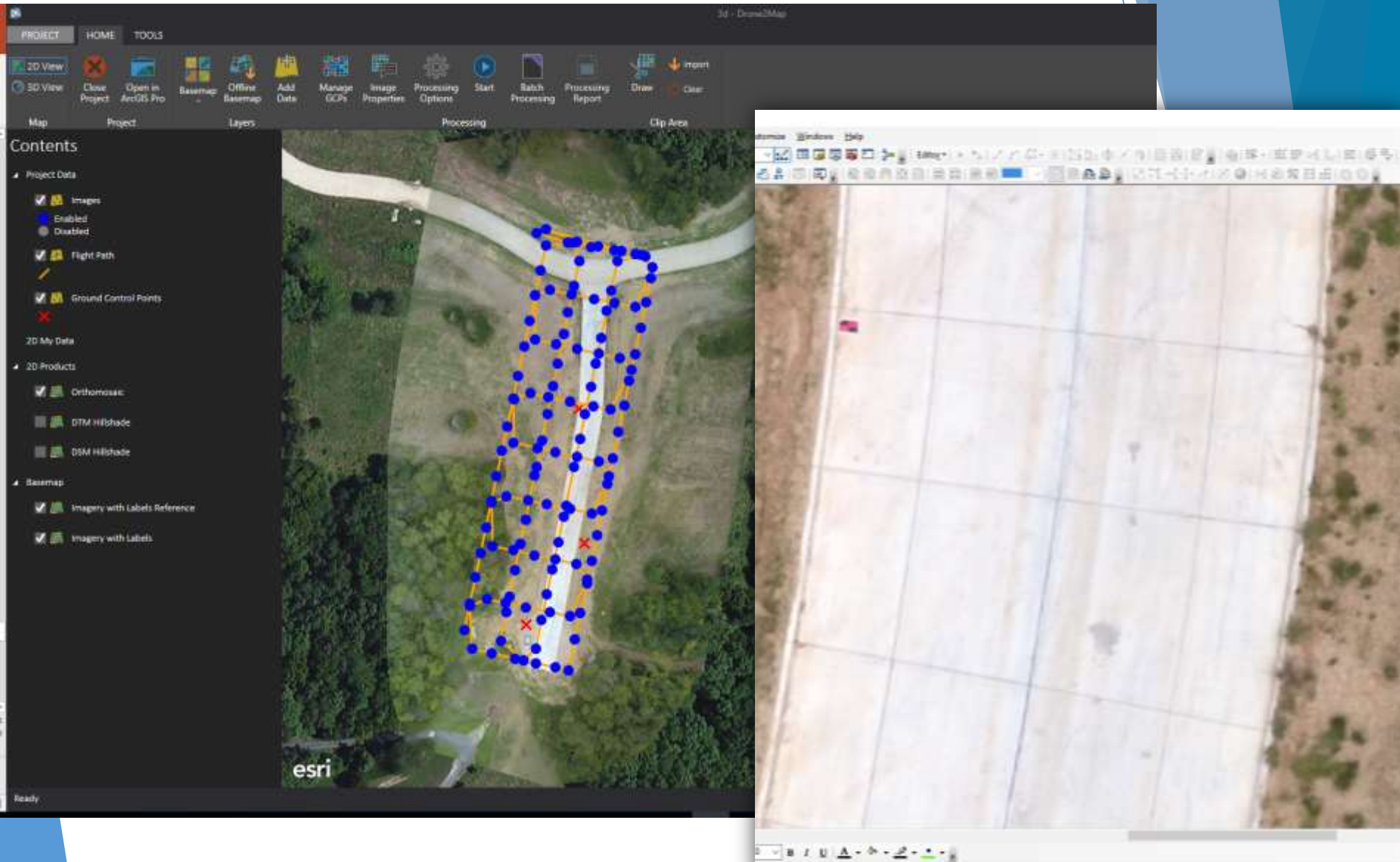
Crime Scene

► Hasty Wide Area Search & Ortho



Asset Inventory/Inspections

► Concrete Pavement Panels



Asset Inventory/Inspections

► Bridges



Camera Resolution

400' AGL



Tax Assessment

- ▶ Real Estate
- ▶ Personal Property



Work Continues

- ▶ Situation Assessment Team/Truck - Operational Unit of Missouri Task Force 1
- ▶ Continue to Build ICS and Field User Support for Technology
- ▶ Add Professional sUAS with Thermal and Zoom Cameras
- ▶ Portal-to-Portal Sharing between County, State, & Federal



Questions?

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GPS USE AND FILE CONVERSION PROTOCOL

Search Information Standardization Ad Hoc Work Group

ABSTRACT
Preparation of Map
Images overlaid with
GPS Track Log and
Waypoint
Information for
presentation to IC,
IST and Task Force
Leaders.

Dave Weber, PE,
Missouri Task Force
FEMA US&R

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