LAUNCHING YOUR UNMANNED AIRCRAFT PROGRAM
UNMANNED AIRCRAFT APPLICATIONS
AERIAL INSPECTIONS

- Safer and faster alternative to visual inspection by an individual
- Damage assessment
- Buildings, towers, utilities infrastructure, etc.
- Rotorcraft UAS are typically preferred
- Visual, thermal, multispectral, or other cameras/sensors utilized
AERIAL MAPPING AND SURVEYING

- Photos captured by sUAS are processed using orthomosaic, photogrammetry software.
- 3D modeling of structures and terrain also possible.
- Have the potential to generate GIS Survey quality maps with 1cm accuracy.
- Visual, IR, LiDAR and other imaging solutions.
The Federal Aviation Administration

- Responsible for all aircraft in the National Airspace System (NAS)
- Tasked with creating laws for drones
PART 107 REGULATIONS

The FAA's first UAS rule
Covers:
- Operational Limitations
- Operator Certificate
- Operator Responsibilities
- Aircraft Requirements
OPERATOR CERTIFICATION AND RESPONSIBILITIES

- Obtain a Pilot Certificate with a sUAS rating
- Pass Aeronautical Knowledge Test: Every 24 months
- Vetted by the TSA
- Aircraft must be registered

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OPERATIONAL LIMITS

- Maximum Altitude: 400 feet
- Aircraft Under 55 lbs
- Maintain Visual Line of Sight
- Daylight Operations Only
- No flying over the public
- Class B, C, D, and E Airspace requires specific authorization
- Visual Observer may not be required
WHERE DO WE START?
FAA CERTIFICATION

AERONAUTICAL KNOWLEDGE REQUIREMENTS

- sUAS Regulations
- Airspace
- Flight Restriction
- Chart Study
- Airport Operations
- Radio Communications

- Aviation Weather
- Maintenance and Procedures
- Crew Resource Management
- sUAS Loading and Performance
- Hazards and Emergencies
- Aviation Physiology
BASIC sUAS FLIGHT TRAINING
FUNDAMENTAL SUAS PILOT SKILLS

- Keep Drone Inside Green Box
- Buffer Zone
- Flight Line
- Stand Behind Flight Line
FPV FLIGHT COMMAND AND CONTROL SOFTWARE
AUTONOMOUS FLIGHT MODES AND EMERGENCY PROCEDURES

• Allows for semi and fully autonomous control of the aircraft
• Data from the aircraft’s positioning and navigation sensors used to calculate autonomous control
• Can reduce workload, simplify complex maneuvers and increase accuracy and efficiency in data collection
sUAS PLATFORMS AND PAYLOADS
MULTIROTORS UAV AIRFRAMES

- Similar to helicopter in function
- Ideal for Aerial Inspection Operations
DATA CAPTURE TOOLS

Cameras:
- Visual Imaging: 4K - 5.2K Cinema Quality Video, 10MP - 20MP Photos
- Thermal / IR Imaging: Various Capabilities
**POWER SYSTEM**

- **Batteries:**
  - Multicopter: 20 – 45 minutes is typical
  - Fixed-Wing: 30 – 90 minutes is typical
  - Multiple Batteries/Multi-Charger is recommended for commercial use
Vision Positioning:

- Keeps aircraft steady indoors or when GPS satellites can’t be acquired.
- Accuracy may be degraded over solid color surfaces, soft ground, or water.
Obstacle Detection:

- Monocular cameras & image recognition software detect objects, distance, and movement.
- Infrared Sensors map the immediate vicinity to enhance flight accuracy (P4 Pro).
USE CASE OVERVIEW: AERIAL INSPECTIONS
• Access hard to reach or hazardous areas
• Identify items of concern quickly and easily
• Respond quickly to assess damage after severe weather
• Save thousands by conducted preventative, as opposed to reactive repairs
STRUCTURAL INSPECTIONS

• Utilize sUAS fitted with optical cameras and/or thermal imaging equipment
• New FAA regulations allow for the use of sUAS to survey and inspect structures of any size/height without special approval
MULTISPECTRAL IMAGING

- Identify areas of energy loss
- Analyze material composition
- Locate hidden areas of water damage
- Gather environmental data
CHECKLIST

- Check Legality and Safety of Flight Location
- Understand Your Goal
- Plan the Flight
- Review Site and Edit List of “Focus Areas/Points”
- Choose Camera Settings
- Capture the Shots
- Follow Your Formula
- Review Your Work
REVIEW SITE AND EDIT SHOT LIST

Trees

Power Lines and Highway

Hospital Heliport
WINDY DAYS

- Communicate weather limitations with your customer
- Gimbals
- Obstacle avoidance
- Battery life
TEMPERATURE CONSIDERATIONS

- Batteries
- Personal fatigue
- Clothing
PRECIPITATION CONSIDERATIONS

- Snow
- Rain
- Fog
Shoot with the sun behind you
Mid-day timing to reduce shadows is an idea
Adjust exposure values or utilize exposure bracketing to adequately capture areas of interest
USE CASE OVERVIEW: sUAS MAPPING AND MODELING
PHOTOGRAMMETRY AND ORTHOMOSAICS

Cost effective solution for a variety of specific applications

2D or 3D site maps/models

Orthomosaics can be further analyzed with software solutions to assess damage, generate measurements, and calculate project costs
HOW IT WORKS

Analyze

Process

Fly
STOCKPILE MANAGEMENT

- Monitoring sections that are too dangerous to have an employee inspect
- Monitoring the growth/use
- Checking areas that have a risk of hazardous materials
- Mapping changes in overall inventory
3D MODEL GENERATION AND EXPORT
EXPORTABLE FILES – CAD SOFTWARE
COMPATIBLE
LiDAR - LIGHT DETECTION AND RANGING
LiDAR FOR MAPPING AND MODELING

• Utilize laser array to range distance to terrain/objects and “map” the results
• Extremely accurate elevation and shape profiles (mm accuracy)
• Highly effective for detailed inspections of utilities/communication infrastructure when used for 3D modeling
ADVANCED SCENARIO-BASED FLIGHT TRAINING
SUAS SYSTEM SPECIFIC TRAINING
ALL TRAINING FLIGHTS CONDUCTED “ON LOCATION”
TRAINING CENTERED ON YOUR S.O.P.
OUR CURRENT COURSES

**Open Enrollment**
- Basic Flight Training
- Part 107 Test Prep

**Online**
- Drones for Beginners
- Starting a Drone Business
- Aerial Photography

**Workshops**
- Aerial Mapping & Modeling
- Aerial Roof Inspections
OTHER OFFERED SERVICES

**Custom Team Training**
- Flight Training
- Part 107 Prep
- Mission Specific Training

**Consulting**
- Drone Program Launch Guide
- SOP Development
- Program Manager Guide
- Equipment Procurement
- After Course Support
Amelia Owre is a former Navy helicopter pilot who flew the SH-60F, HH-60H and MH-60S prior to transitioning to unmanned systems. She spent 5 years developing curriculum and implementing training for the Navy's MQ-8 Fire Scout UAS, and continues to instruct UAS operators as a current Naval reservist. She is a graduate of the U.S. Naval Academy and holds an M.S. in Environmental Science, a Commercial Pilot Certificate with fixed wing, helicopter and instrument ratings, and a Remote Pilot Certificate. Amelia focuses on developing new curriculum for DARTdrones and coordinating our subject matter experts.