Drones for efficient energy and infrastructure inspection

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What are drones?

- Small Unmanned (uncrewed) aerial vehicles
- Remotely piloted or automated
- Consumer drones .55lbs to 55lbs
- Commercial drone industry is expanding (quadcopters and fixed-wing aircraft)
- Regulated by the FAA

Commercial uses of drones

- Infrastructure Inspection
- Utility Inspection
- Surveying/Mapping
- Construction
- Insurance
- Architecture
- Geography/GIS
- Archeology
- Marine Biology
- Public Safety
- Search & Rescue
- Cinematography
- Photography
- Real Estate
- Journalism/Media
- Precision Agriculture
- Medical transportation
- Package Delivery
- Advanced Air Mobility
- And many more…

The drone industry is growing

- By 2026, the commercial market is expected to generate over $41.3 billion USD and growing at a CAGR of 9.4%.
- Top Industries for drone applications are Energy, Construction, and Agriculture.
- Drones help reduce time and costs while improving result quality and worker safety. Drones save money and lives.

* According to a 2021 study by Drone Industry Insights

Drones for Inspection

- Visual inspections are critical to ensuring the proper maintenance of a company's or organization's assets.
- Drones can be equipped with sensors that allow other kinds of inspections.
  - Agriculture drones with multispectral sensors to record images of crops in distinct spectral bands
  - HVAC, roof, and solar panel inspections use thermal imaging
  - Powerlines and utilities can use LiDAR sensors measurement and inspection.
  - More sensors being developed.

Why drones are important for inspection

- Improves maintenance costs
- Inspections often don’t find anything that needs to be fixed (only 10-20% of inspections find a problem that requires fixing).
- Scaffolding, ladders, lifts, etc. can be expensive. Companies can reduce their corresponding maintenance expenses by up to 80-90% with focused drone inspection.
- Reducing the time an inspector has to be in a dangerous situation by 80-90% represents a huge potential saving in liability insurance costs.
- Savings on eliminating or minimizing interruption or down time of operation
- Increased safety through increased inspections
- Better records with drone data

Basic Drone Laws

- Maximum altitude 400 feet
- Can only fly as far as pilot can see it
- Cannot fly over people
- Can fly at night, but need additional lighting
- Need authorization from FAA to fly near airports
- Pilots need certification from FAA
  - Commercial
    - Part 107 certification
  - Hobbyist/Recreational
    - TRUST certification

The Fullerton Drone Lab

At Fullerton College

OVERVIEW

The mission of the Fullerton Drone Lab at Fullerton College is to educate and train individuals in the legal and ethical use of unmanned systems and their workforce applications to prepare them for enhanced opportunities. With a combination of classroom and field work, along with and emphasis in hands-on learning, the Fullerton Drone Lab is focused on developing qualified, knowledgeable, and safe drone professionals.

ABOUT THE DIRECTOR

Jay Seidel is professor and director of the Fullerton Drone Lab at Fullerton College. Always had a passion for aviation. Was a member of the Civil Air Patrol as a teenager, flew gliders and immersed himself in all things aviation. This, coupled with a passion of visual storytelling and an interest in technology lead to drones and the creation the Fullerton Drone Lab at Fullerton College.

- Part 107 certified UAS Pilot
- AUVSI TOP (Level 3) UAV Instructor
- FAA Safety Team Drone Pro for Orange and Los Angeles counties.
- Certified sUAS Thermographer
- President of AUVSI California Chapter
- Author: *Drones: Training and Applications to Digital Imaging*
- U.S. Army veteran

BY THE NUMBERS

- Started in 2018
- 10 courses (more in development)
  - Piloting
  - Application
  - Building/Repair
- 3 certificates (more in development)
- 1 Associate of Science degree
- Mobile Command Vehicle
- Trailer/Mobile classroom
- 38 aircraft (current fleet)
- 1 ROV
- 1 Rover

COLLABORATIONS

The Fullerton Drone lab has developed mutually-beneficial partnerships with many outlets that provide real-world and hands—on training and experience for our pilots.

Partnerships include training and experience in:

- Mapping
- Inspection
- Precision Agriculture
- Photogrammetry
- Marine Biological Research
- Photography/Media

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CERTIFICATIONS

The Fullerton Drone Lab is recognized by the following organizations

FAA Collegiate Training Initiative

ASTM Approved Training Provider

AUVSI TOP Service Provider

FULLERTON DRONE LAB FIRSTS

- Established two Drone Pathways with local K-12 districts to engage students as early as 6th grade in drone technology and carry them through to the Drone Lab's certificate and degree programs.
- Established partnership with the County of Orange to provide vocational drone training for at-risk youth to provide marketable and useful skills for the workforce.
- Established first ever state-certified drone piloting apprenticeship program to allow students to work with professional organizations and provide resources while gaining real-world experience.
- Established scholarship program to provide financial resources for qualified students who can benefit from financial resources to complete the program and purchase their first drone.

FULLERTON DRONE LAB FUTURE

- Completing requirements for authorization to conduct operations Beyond Visual Line of Sight (BVLOS) and expanding training
- Developing sUAS maintenance and repair technician program funded by FAA workforce development grant
- Expanding LiDAR and Multispectral application training program
- Continuing to work with various disciplines to integrate drone training into their programs (administration of justice, GIS, architecture, construction technology, etc.)
- Finding and working with new partners to provide mutually beneficial training opportunities for our pilots and technicians.

CONTACT

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