



Unmanned Aircraft Systems

Ric Stephens

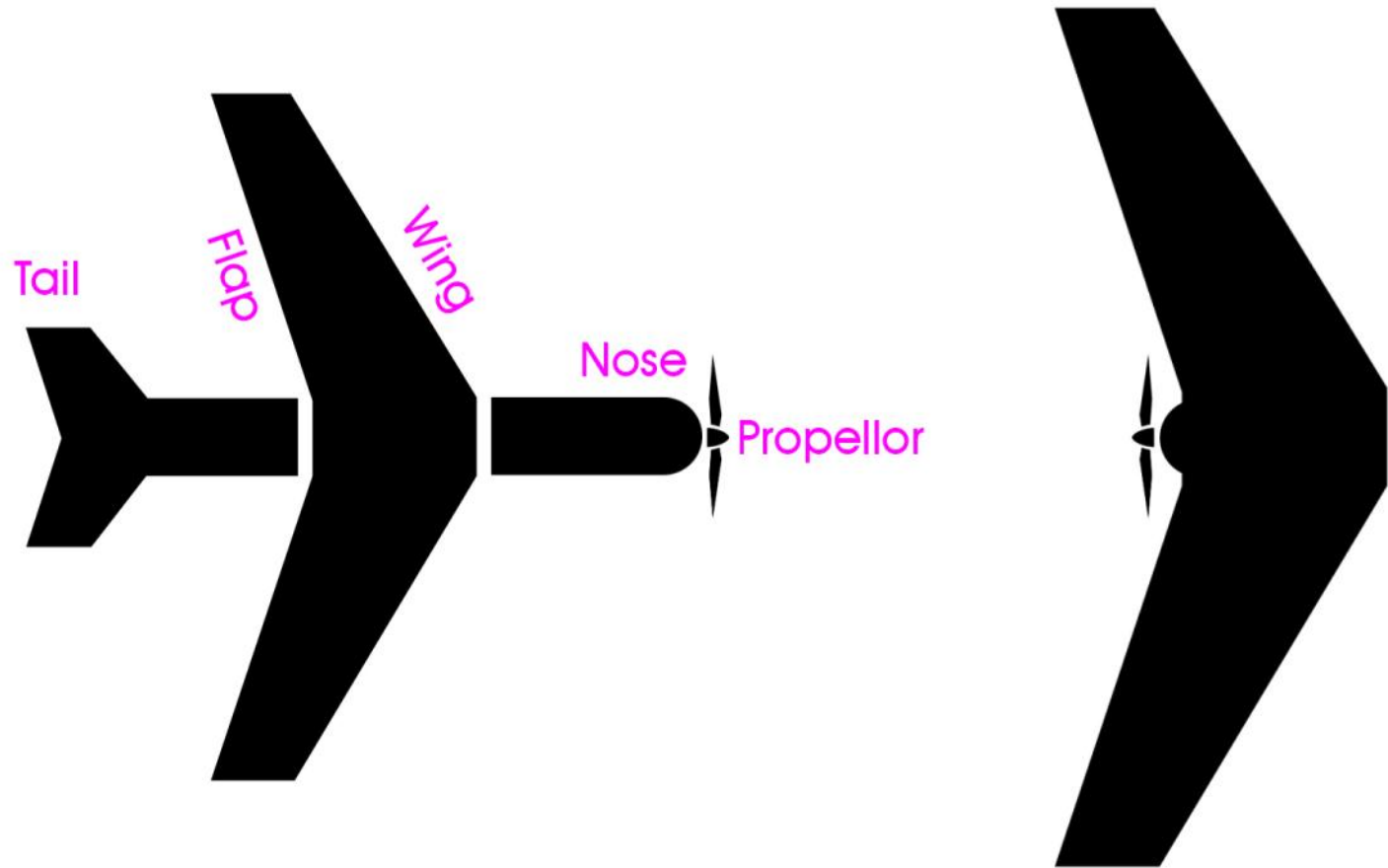
Natural Resource Applications I

- 1.3D mapping and modeling
- 2.Algae proliferation monitoring
- 3.Animal/pest deterrent
- 4.Anti-fishing monitoring
- 5.Aquatic vegetation analysis
- 6.Audio/noise measurement
- 7.Cartography
- 8.Chemical dispersant
- 9.Climate change monitoring
- 10.Coastal water quality / surveillance
- 11.Entomology research
- 12.Environmental compliance/protection
- 13.Environmental impact assessment
- 14.Erosion detection & monitoring
- 15.Fish detection & monitoring
- 16.Fish population survey / inventory
- 17.Fish school tracking
- 18.Fisheries management
- 19.GIS data capture
- 20.Habitat mapping & monitoring

Natural Resource Applications II

- 21. Hydrometric mapping
 - 22. Infrared hydrology analysis
 - 23. Marine sanctuary monitoring
 - 24. Mosquito breeding detection & treatment
 - 25. Pest/invasive species detection & control
 - 26. Plant disease detection & control
 - 27. Predator control
 - 28. Saltwater infiltration detection & monitoring
 - 29. Sand bank shift
 - 30. Scent/pheromone dispersant
 - 31. Sea level rise measurement
 - 32. Surveying
 - 33. Thermal monitoring
 - 34. Tidal zone modeling
 - 35. Vegetation identification
 - 36. Water pollution measurement & treatment
- Related commercial applications e.g. videos*

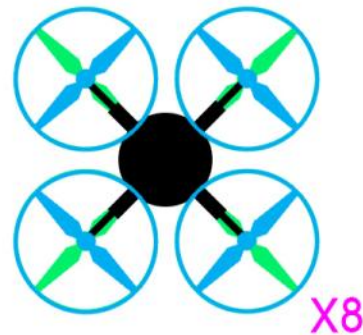
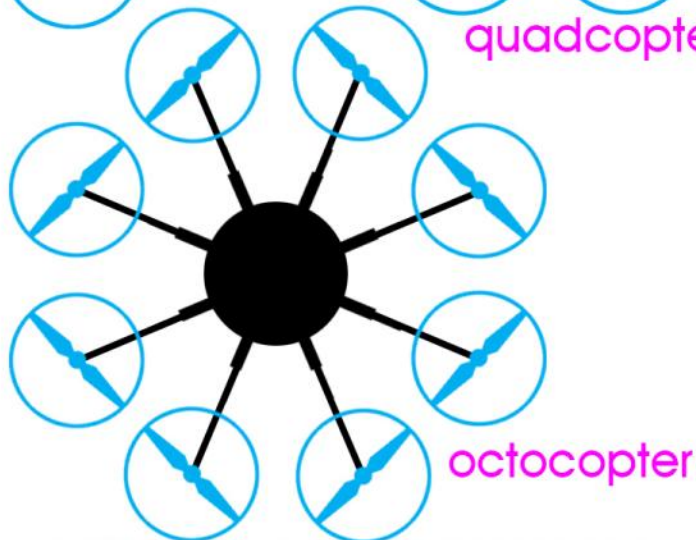
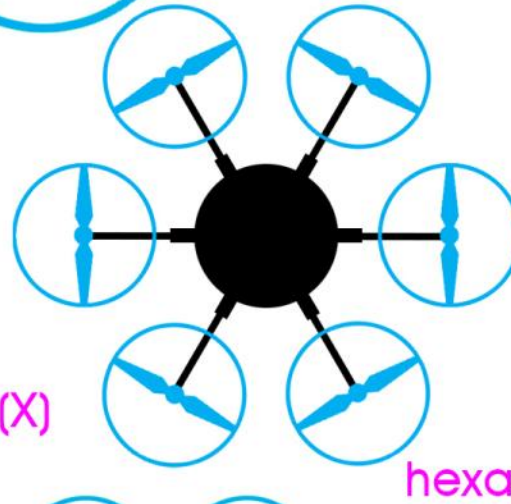
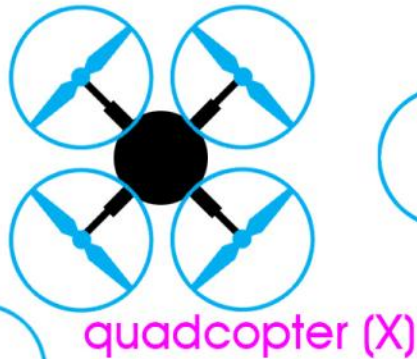
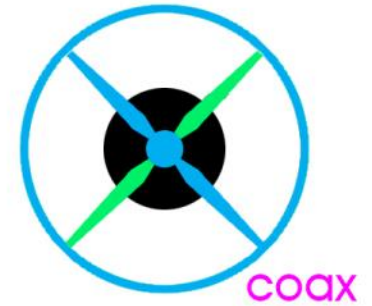
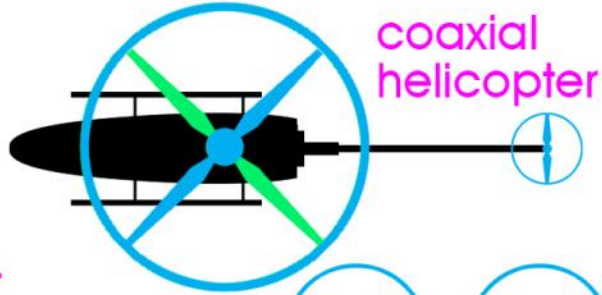
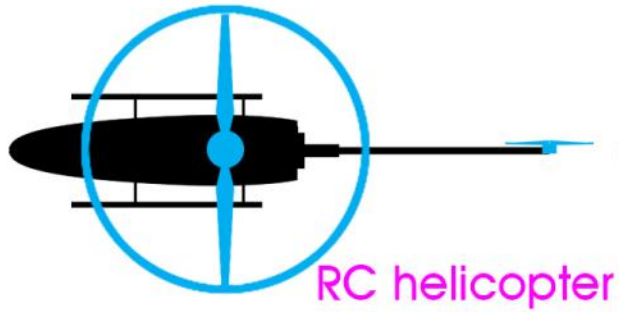
Fixed Wing UAVs



“Airplane”

“Flying Wing”

Multicopters



For multicopter with single forward motor, replace initial with "plus" (+) or "l"

Sensors & Robotics



Audio



GNSS / GPS



LIDAR



Moving Target
Indication



Multispectral
imaging

- Visible (photo/video)
- Infrared IR (incl. thermal)
- Ultraviolet UV



Optical sensors



Pressure,
temperature,
humidity



RADAR (SONAR)



Dispersants



IR beams



Laser Illuminator



Light



Sound

Features

- Aquatic
- Durable
- Economic
- High-payload capacity
- Low-maintenance
- Maneuverable
- Multifunction
- Programmable
- Speed; long distance & flight time
- Stable

Sample UAVs I



3DRobotics Iris



DJI Matrice 100



Walkera Voyager 3



Yuneec Typhoon H

Sample UAVs II

Parrot senseFly eBee



PrecisionHawk

Tayzu Quadra



DIY hexacopter

Trends & Projections I



Safety, Privacy & Nuisance

- Sense and Avoid, Air Traffic Control
- Shifting public opinion



Technology, Robotics, AI

- Miniaturization & Mass-production
- Applications & Autonomy



Legislation & Regulation

- FAA AC 91-57A → ?
- Public / Institutional / Commercial

Trends & Projections II



Applications

- ~40 in 2013 → +400 today →
- Shift from passive to active apps



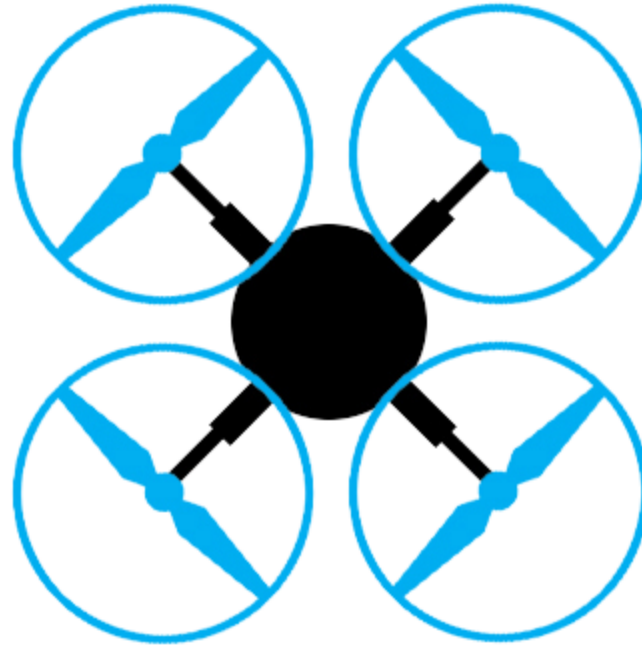
Proliferation

- ~700,000 purchased in 2015
- +30,000 commercial UAVs in 2020



Next Steps & Resources

- Education & Training
- UO Drones blogs.uoregon.edu/drones/



Thank you for your interest

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