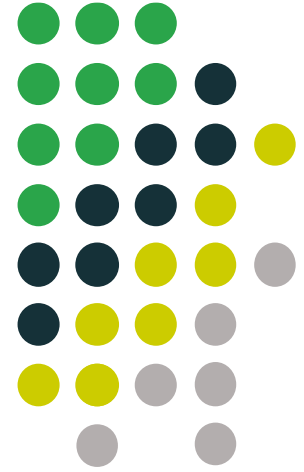


Drones for efficient infrastructure management



Presented by:

Wilson M. Gichuru

wilson.gichuru@piu.ac.ke



Definition of drone:

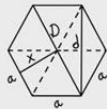
An autonomously or semi-autonomously operated aerial vehicle used to perform flights while carrying a payload without a pilot onboard.



A History of Drones



1849
Austria bombs Venice with balloons.



1935
Reginald Denny develops the first remote controlled model airplane.



1973
Camera-fitted UAVs are improved to be able to provide real-time surveillance.

1970
Drones with cameras are first used, as well as drones used as decoys.

1959
U.S. Air Force begins official planning for development of unmanned aircraft.



'80s-'90s
Further improvements to miniaturization lead to rapid acceleration in development.

2005
Hand-held classification drones become easily accessible to hobbyists.

Today
Drones are commonplace and are used for recreational as well as commercial purposes.

The Future



● Past



● Present



Download from
Dreamstime.com

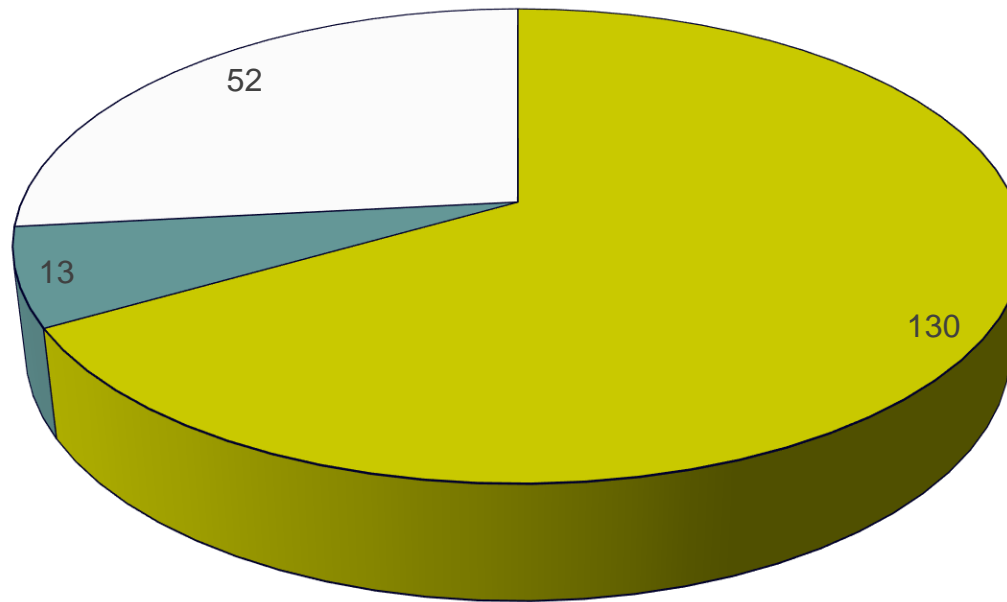
Download from
Dreamstime.com

Worldwide use of drones



What is the level of acceptance and use of drones today?

2016



■ Regulated ■ Banned ■ Other ■

40

Uses for Drones

Practical applications for Unmanned Aerial Vehicles



DJI Spreading Wings S800 Evo



Emergency Services & Disaster Recovery



1. Disaster & hazmat monitoring
2. Emergency delivery (medicine, equipment, supplies...)
3. Emergency response coordination (situational awareness)
4. Disaster relief & post-disaster assessment
5. Search & rescue

Security Services



6. Crime scene investigation
7. Criminal surveillance & tracking
8. Police response coordination
9. Security surveillance
10. Training & evaluation

Agriculture, Aquaculture, Silviculture, Viticulture



11. Chemical & biological monitoring (irrigation, pesticides, treatments...)
12. Flood & fire detection & monitoring
13. Inventory & records
14. Pest & disease detection & treatment
15. Precision operations & management

Environmental Management



16. Environmental hazard assessment
17. Environmental impact assessment & compliance
18. Invasive species & pest control
19. Scientific research
20. Wildlife & habitat monitoring & protection

Urban Planning, Real Estate, Architecture & Engineering



21. Construction management
22. Environmental design (architecture, engineering, landscape architecture, urban design)
23. Mapping (archaeology, resource, topography...)
24. Marketing
25. Site analysis, planning & design

Media & Communications



26. Advertising & marketing
27. Art (commercial design, fine art, social practice...)
28. Entertainment (film, television, Internet...)
29. Investigative journalism
30. News photography & videography

Business & Commerce



31. Aero-technology / robotics research & development
32. Documentation (accident reporting, building verification, site status...)
33. Exploration (water, oil, gas, mineral...)
34. Inspection (infrastructure, structural, industrial...)
35. Pick-up & delivery services

Recreation & Entertainment



36. Exploration
37. Group activities & events
38. Hobby (do-it-yourself & kit building)
39. Personal photography & videography
40. Remote control flying

The potential value of unmanned aerial vehicles (UAVs) is extraordinary. Privacy and safety issues must be addressed rationally and within the larger context of these public and private benefits.

Stephens Planning & Design LLC
July 19, 2014



Case studies



Mapping 1000km of highway in Mexico.

- Using drone - DJI phantom 3 pro drone type.
- Number of operators – 8 people.
- 114,043 images were processed using 1 computer.
- 869 orthomosaic maps were created.
- 3 weeks.

Case studies



Minnesota bridge inspection

- *The traditional way is the use of aerial work platforms (AWP) or under bridge inspection vehicles, ladders or ropes for access.*



Outcome of using drones for bridge inspection.

Second largest bridge in Minnesota

- Total cost of **\$20,000** (66% saving on finances)
- Produce 3-D models of the bridge elements
- the payloads - a *standard camera*, an *optical zoom camera* and an *infrared camera* to produce a strong outcome on structural inspection
- 3 days less than the traditional way of inspection



Benefits of UAV in infrastructure management...



Challenges too... But

1. Reach difficult areas.
2. Provide data used for preventative maintenance planning.
3. Access areas of health and safety risks to humans.
4. Quick response time during inspections.
5. Deployed quickly for inspections.
6. Reduce downtime in operations.

Summary and recommendations



- Increase efficiency
- Cut costs
- Better output
- Higher success in multidisciplinary inspections
- Improve the quality of work & working conditions

Who has done it already?

Fan fact...

Puntland Somalia....

