Association for Citizenship Teaching

Non military use of drones

This document exemplifies the new uses that drones can be used for that can be of enormous benefit to communities and governments.. These might be used by government agencies, NGOs or private operators

1. **Agriculture** - The Association of Unmanned Vehicle Systems International (AUVSI) reports that the agricultural use of drones could comprise 80% of the future use of drones. The reasons include the need to closely monitor crops to improve management and yield, the need to do this more regularly and cheaply, and the environment of private land with little threat to others. Near-infrared sensors can be tuned to detect crop health, letting farmers react and improve conditions locally with inputs of fertilizer or insecticide.

2. **Mines** - Mining companies are already deploying drones worldwide with great efficiency and safety gains to accurately measure site conditions, inspect pit walls, calculate quantities, and measure and map in 3D. Photogrammetric techniques are used for 3D modelling however more precise laser LiDAR sensors for UAV platforms will be developed in time.

3. **Construction Sites** - The monitoring from above of construction project sites provides a new input during all phases of a project lifecycle. Aerial photography is currently used on only the largest projects but this will change in the future as costs reduce. The ability to quickly model from above in 3D with increasing precision will provide a check on projects compared to plans, as well as the better coordination of materials on the job site.

4. **Infrastructure Inspection** - From pipelines to power lines to towers, to processing plants, the inspection of complex infrastructure will benefit from regular aerial monitoring. The ability to sense in three dimensions, take thermal readings, and to detect metal strain will greatly improve infrastructure inspection. Small and unmanned platforms that can hover and get close and surround infrastructure, such as a bridge or plant, will provide a new level of detail to improve performance. This will be especially useful following massive power disruption when power lines may be brought down in rural and remote areas that are difficult to reach.

5. **Wildlife Research** - Drones are being used internationally to monitor and track wildlife, providing new insight into animal behaviour, as well as protection from poachers. With the ability to operate at night, and with thermal camera sensors, drones provide unprecedented protection.

6. **Prospecting** - Mineral and oil and gas exploration is a natural fit for drones, with field prospectors extending their toolset with aerial sensors to confirm and expand their insight. Magnetometers on aerial platforms can be used to detect ferrous metals and gravitational fields, with less of a disturbance due to their size.

7. **Storm Tracking/Forecasting** - Sending drones into hurricanes and tornadoes provides new insight into their behaviour and trajectory. Unmanned systems reduce the costs and danger of using manned planes and are the best approach to these dangerous situations. With specialized sensors to detail weather parameters, new insight of how such natural systems work becomes possible.

8. **Emergency Response** - After a natural or manmade disaster, a drone provides a quick means to gather information, navigate debris with a portable and useful technology that doesn't drown

out cries for help, and that can be deployed by teams that are working a specific area.

9. **Environmental Monitoring** - Drones fill a gap between manned aerial inspections and traditional fieldwork, monitoring hard to reach areas, or taking reading in contaminated areas where human health would be at risk or in danger zones. The ability to quickly deploy and capture an area of interest in concert with in-situ measurements provides an advantage to contamination and reclamation work. They might also be used to survey areas for land mines and bombs and other weapons following conficlt. Near-infrared sensors provide details of plant health to determine environmental health. The site-specific insight will greatly improve habitat restoration, environmental assessments, monitoring, and remediation.

10. **Search and Rescue** - With thermal sensors, drones can quickly discover the location of lost persons, and are particularly useful at night or in challenging terrain. The search and rescue mission is a battle against time, particularly in harsh conditions, and drones become a powerful tool because of the ease of deployment.

Drones provide a paradigm shift for remote sensing, given their portability, low cost of operation, ease of use, and the automation of the analysis. It's just a matter of time before regulations are lifted, and they are widely used. There are legislative efforts that could dramatically impact their utility, but with a focus on best-use, and with tailored sensor and platforms for these applications, their benefit will be broadly felt without repercussion to privacy.

See more at:
https://www.sensorsandsystems.com/dialog/perspectives/30861-what-are-the-top-ten-civilian-uses-of-drones-that-don%E2%80%99t-impin#sthash.dTk9C9g9.dpuf

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