



## How to Train your Drone

### 1. Introduction

Until recently, unmanned aerial vehicles (UAVs), or drones as they are more colloquially known, have been largely associated with warfare and the West's fight against terrorism. But while their military purpose has remained unchanged, drone technology is expanding beyond the War on Terror and may soon land on your doorstep if you can afford to pay approximately R10 000 for one. Not too long ago, drones would have been the stuff of a bad Terminator movie, but now this 'eye in the sky' technology is real, and civilians are purchasing the technology at an ever-increasing rate. According to *Business Insider*<sup>1</sup> it is estimated that there will be 30 000 drones in United States airspace by the year 2020. Without a doubt, the rapid advancement of drone technology poses various challenges and concerns, relating particularly to the regulation of UAVs and the invasions of privacy. While 30 000 drones in South African airspace is a far-fetched possibility, the South African Civil Aviation Authority (CAA) has already drafted rules that will regulate the use of UAVs; these were put into effect 1 July 2015. It is worth noting that South Africa's policy on drone usage is significantly ahead of the International Civil Aviation Organisation's (ICAO) Remotely Piloted Aircraft System (RPAS). The ICAO will make public its first UAV standards only in 2018. Steadily, drone technology is being introduced to the South African public, and a drone academy called Curiosity Campus has been established to teach South Africans more about UAV technology and how to operate it.

### 2. The Good

Whilst the benefits of drone use in civilian airspace have universal application, there are a number which will find particular application in the South African context:

- **Anti-rhino poaching:** South Africa is home to both the black and white rhinoceroses. According to recent statistics released by the Norton Rose Fulbright firm<sup>2</sup>, 1215 rhino were killed illegally here in 2014. It is estimated that in 2016, this figure will rise to outnumber live births, triggering the point at which rhino will head toward extinction in South Africa<sup>3</sup>. The sheer size of the area, the difficult terrain and the need to monitor it 24 hours a day, coupled with the distances that the animals move over any given period create huge challenges in protecting South Africa's rhino population. National Parks, conservation organisations and other related groups are committed to prevent further poaching and have, as consequence, employed drone technology as an efficient and effective way of combatting this onslaught on wildlife<sup>4</sup>. Unofficial statistics show a marked decrease in the number of poaching incidents as a result, with some areas having, apparently, achieved complete abatement for the time being<sup>5</sup>.
- **Farming technology:** According to a paper published by the Norton Rose Fulbright firm<sup>6</sup>, in 2009, a survey of commercial farmland in South Africa found that there were about 46 000 commercial farms under private ownership with an average size of 1 200 hectares<sup>7</sup>. Often the poor infrastructure connecting farms to public roads makes basic exercises such as surveillance of perimeter fences or monitoring of wandering livestock time-consuming and prohibitively expensive. Even the simplest surveillance drone technology will revolutionise the ability of South

African farmers to perform these tasks quickly and cheaply. Of course, South African farmers will also benefit from the more advanced farming technology being developed: crop-ripening surveillance for optimal harvesting; micro-drones to pick insects off crops and livestock; and water saturation measurement on a metre-by-metre basis<sup>8</sup>.

- **Crime detection and prevention:** As shown in the release of South Africa's Crime Statistics 2015, the country faces a serious crime problem. Criminal activity as it relates to copper wire theft, particularly, costs the city of Cape Town, specifically, millions of Rands- in 2014 , approximately 170 tonnes of copper wire was stolen each month, equating to R13 million which affected both public and commercial infrastructure<sup>9</sup>. The city's mayor- Patricia de Lille- has announced that the city plans to employ drones to monitor known hotspots for cable theft<sup>10</sup> which will, consequently, save the city millions.
- **Commercial use:** Commercial photography has much to gain by employing drones. Real estate agencies, in particular, can contract a drone-savvy photographer to take aerial shots of property they are evaluating or selling; festival organizers can conduct accurate head counts using overhead photos, architects can employ drones to snap photos of property that may aid them in designing infrastructure to be built there, and news agencies are able to make use of drones, as a cheaper alternative to helicopters, to gain them access to newsworthy imagery.

### 3. The Bad

Despite the useful applications of drones in the aforementioned, there is a legitimate concern about under-regulated drone use:

- **Infringement of privacy:** Most drones are equipped with sophisticated video equipment, night vision and zoom lenses, and are largely inaudible, which increases their capability to identify human targets and intercept communications. Their exceptional capacity for undetected,

pervasive mass surveillance of people- including of actions that may not be discernible to the naked eye- also make it easier for governments to collect information on their citizens. All this presents a clear problem concerning citizens' right to privacy. Drones operate well above eye level which gives them significant intrusive potential. Furthermore, private use of drones by individuals has also been raised as a concern; there have been reports, mostly in the U.S., regarding individuals who employ drones to spy on their neighbours. In Seattle recently, a woman reported a drone hovering outside her bedroom as she was getting dressed; this is an obvious violation of her right to privacy<sup>11</sup>. Since drones present a unique threat to privacy, the circumstances in which they are employed for reconnaissance or surveillance need to be strictly regulated particularly as they can be used against a government's critics or its political or ideological opponents.

- **Aid criminal activity:** Recently, in the U.S., law enforcement arrested two men in relation to drug smuggling by way of drone; the drone was carrying 28 pounds (that is, 12,7kg) of heroin across the U.S.-Mexican border. This was not the first time that a drone had been caught by Border Patrol transporting narcotic substances into the country and, according to the country's Drug Enforcement Agency<sup>12</sup>, in July 2014, drug-carrying drones made an estimate of 150 trips between Mexico and the U.S. Back home, the Western Cape, in particular, is notorious for its bustling drug trade activities<sup>13</sup> and the introduction of drone technology into such a lucrative market can make combatting this social ill tougher and more complicated when the technology cannot be traced back to its owner.
- **Potential of physical harm:** a sudden loss of power could see a drone that weighs approximately 7kgs, fall from the sky and land on an unsuspecting individual. Reprehending the owner of the drone/offender may be unlikely in the event that the drone cannot be traced back to its owner.

#### 4. Train your drone

Below is a summary of South African law and regulations<sup>14</sup> that govern the use of drones by private individuals. Infringement of these can result in severe penalty:

- A valid, CAA-approved remote pilot licence, as well as a letter of approval to operate the drone, is required.
- The letter of approval will be valid for 12 months, and sellers must make buyers aware of the requirements as stipulated in the CAA regulations.
- Drones cannot fly more than 400ft or 120m above the ground, nor within in 10km of an aerodrome.
- Drones cannot be flown within 50m above or adjacent to a person or crowd of people, a structure or a building, without prior CAA approval. Nor can drones be flown adjacent to or above:
  - a nuclear power plant
  - a prison
  - a police station
  - a crime scene
  - a court of law
  - national key points
- The rules also apply o toy aircraft or unmanned free balloons or other types of aircraft which cannot be managed on a real-time basis during flight .
- Public roads may not be used for the take-off or landing of a drone.
- Drones may not be used in adverse weather conditions, or where the operator's view of the drone is obstructed, since visual contact must be maintained by the operator (unless in approved operations beyond visual line of sight or at night).
- A drone must give way to all piloted aircraft and should avoid passing over, under or in front of such aircraft, unless it

passes well clear and takes into account the effect of aircraft wake turbulence.

- RPA pilots will be required to tune into the air traffic services for the controlled airspace in which they will be flying the drone, reporting co-ordinates to the traffic controllers; and all flight activity needs to be recorded in a logbook.
- Drones cannot be used to transport cargo or make deliveries
- Drones cannot tow another aircraft, perform aerial or aerobatic displays, or be flown in formation or swarm;
- All incidents involving an RPA must be reported, especially where there is any injury to a person; damage to property; or destruction of the RPA beyond economical repair.

#### 5. Conclusion

As outlined above, drones present a number of advantages, such as aiding in wildlife conservation, farming, disaster management, potential uses in the commercial sector and aid in the prevention of criminal activity. If drones are employed in law enforcement as a means to combat crime, it is suggested that this only be done with a warrant and to collect evidence of a specific criminal act, and that data should only be retained insofar as it directly relates to the crime under investigation. However if the use of drones are under-regulated or negligently operated, the technology also presents a serious threat to citizens' right to privacy, aerial safety, and can possibly complicate South Africa's fight against illicit drug trading. Lastly, and importantly, drone policies that regulate usage should be made clear and available to the public, and their usage open to reviews and proper oversight. This ensures safe use and will aid in holding drone operators accountable for any negligence on their part.

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<sup>1</sup> “FAA look for 30 000 drones to fill American skies by the end of the decade” by Robert Johnson, retrieved from: <http://www.businessinsider.com/robert-johnson-bi-30000-drones-by-2020-2012-2>

<sup>2</sup>“Civilian Drones and privacy: a South African perspective” retrieved from: <http://www.nortonrosefulbright.com/knowledge/publications/127694/civilian-drones-and-privacy-a-south-african-perspective>

<sup>3</sup> Ibid

<sup>4</sup> Ibid

<sup>5</sup> Ibid

<sup>6</sup> Ibid

<sup>7</sup> Ibid

<sup>8</sup> Ibid

<sup>9</sup> Ibid

<sup>10</sup> Ibid

<sup>11</sup>“Drones in South Africa: the good, the bad and the ugly” by Jane Duncan, retrieved from: <http://mybroadband.co.za/news/gadgets/127528-drones-in-south-africa-the-good-the-bad-and-the-ugly.html>

<sup>12</sup>“Mexico Drug Trafficking: Drone Carries 28 Pounds of Heroin Across Border to US”, retrieved from: <http://www.ibtimes.com/mexico-drug-trafficking-drone-carries-28-pounds-heroin-across-border-us-2051941>

<sup>13</sup> ‘Drug abuse on the rise in the Western Cape’ by Masa Kekane, retrieved from: <http://ewn.co.za/2015/06/21/Drug-abuse-on-the-rise-in-Western-Cape>

<sup>14</sup>“12 Things you need to know about South Africa’s new drone laws” retrieved from: <http://mybroadband.co.za/news/gadgets/126654-12-things-you-need-to-know-about-south-africas-new-drone-laws.html>

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