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Drones – The new kids on the block

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The list of applications of drones becomes longer and longer. They are being used in movie production, aerial photography, inspections, surveying, or in precision farming. The predominant characteristic of these drone operations is that they are highly specialised, occur sporadically, are of short duration, and are conducted confined to an area rather than travelling between locations.

Developments like Amazon's announcement of their Prime Air service or inter-hospital shipments of medical supplies in cities suggest what's likely to be expected: delivery drones are a coming trend. Another, more ambitious one, are passenger drones. Aircraft manufacturer Airbus is developing the CityAirbus, a flying cab, and Chinese prodigy EHANG plans to operate a taxi service in Dubai starting in summer 2017. Who hasn't

secretly dreamt of flying to work, instead of being gridlocked on the ground with everyone else?

Delivery and taxi drones cater to two very basic needs: they promise alimentation and individual mobility. Where specialised drone operations address industry services more than individuals' needs, delivery drones and taxi drones have the potential of becoming a mass phenomenon, especially in the cities. Since more than half of the global population inhabits urban environments, numbers rising, this is a no-brainer.

With the numbers of drones increasing, so does the risk of incidents. Collisions with other drones or objects become more likely the more drones or objects there are. In consequence emerges the need to manage drone traffic. When the automobile was making its first appearance about one hundred years ago, there were only a very few people driving around in one of those horse-less carriages. There were no measures necessary then to protect other road users from being run over, other than some person walking in front of the car, waving a red flag or a lantern. Since then cars have taken the streets, and pedestrians and cyclists have been banned to the pavements and sidewalks. Originally, police people were controlling traffic at busy junctions and intersections. With time, road signs and traffic lights took over. Something like that is going to happen to drones. The more airspace users exist, the more complex the interaction, the more need is there to manage traffic, to make it safe for everyone.

How would that look like for drones? Are we going to have airborne traffic lights?

Before answering this question, what kind of traffic are drones: Air traffic or urban traffic? The prevailing answer to this question is air traffic. It seems self-evident. Drones share the physical principles of flight with all other aircraft.

But operational requirements for drones are significantly different. In conventional aviation, a significant part of the traffic is being managed by air traffic control. Huge radar dishes have been installed for surveillance, aircraft have been equipped with transponders for identification, and flight plans are being filed. The major part of flight operations have been planned well in advance: hours before the flight actually took place. In a nutshell, conventional aviation comprises airspace users that identify themselves, plan ahead, and report intent. It is not surprising, that there is a desire that drones do the same: register, identify, and file flight plans. But is that feasible for the kind of drone operations that have been outlined above?

In conventional aviation, passengers play by airline's schedules. But when drone operations are highly individual, customer is king and dictates where and when flights are being conducted. On a whim, maybe; definitely not after filing a request the day before. Homo Sapiens is a creature of habit. But we don't leave the house at the same time every day. Things come up all the time. Forgot something from the supermarket? Had a friend or neighbour ask for your time? If we are expected to pay for a service, it better cater to our individual needs.

And two other things: drones don't go from aerodrome to aerodrome. Every garden, roof, or parking lot can be a place to land. And drones have to deal with obstacles much more than conventional aviation. Aircraft in general, don't have to deal with buildings, trees, or other kinds of traffic in the same airspace. Drones do. This increases complexity to a dimension that has never before applied to conventional aviation.

In conclusion, the differences between conventional air traffic and drone traffic are actually significant. Reflexively opting to extend existing management rules and procedures to drones falls short of managing them both safely and efficiently. They are a new kind of traffic. Like back then, when the automobile found it's way into our lifes. The only thing that drones and conventional aircraft really have in common: they fly.