



## Back-to-Back Talks on Drones for Engineers

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On 7<sup>th</sup> September 2019, the IEM Electrical Engineering Technical Division (EETD) has organised another back-to-back Saturday talk at Wisma IEM. Both talks were focussed on the common theme of drones and engineers. The first talk titled “Drones - Engineers' Resources in the New Digital Era” was attended by 79 participants while the second talk titled “How Drones are Transforming Engineering” was attended by 44 participants.

Before the talks kicked off, Ir. Amir started off by defining a drone as an unmanned aerial vehicle which can fly autonomously. Unlike remote-controlled plane, drones are solid built, multipurpose, could be autonomous and offers better manoeuvrability. Drones are extensively used in various applications including emergency services, security, agriculture, environmental, media and communication, business and commercial, recreation and entertainment, urban planning, architecture and of course engineering. He then handed the stage to Mr. William Alvisse who is the current secretary of Malaysia Unmanned Drone Activist Society (MUDAS).

According to Mr. William, drones are increasingly used in the construction industry. Drones can also move on land, not just flying on air. Drones can be of fixed wing or with multirotor. It can be categorised into toy grade, hobbyist or professional. Drones which are 3D-printed are also gaining popularity especially among hobbyists. Mr. William also introduced racing drone, swarm drone and prosumer drone. Drones have been a huge disruptor to the aerial photography industry due to its extreme cost advantage. He opines that swarm drones will soon oust fireworks. Agriculture is yet another industry with increasing usage of drones. Drone pilots are hired to perform tasks such as spraying pesticides and monitoring lifespan of trees and crops, jobs which are previously done by cheap labours.

Technically speaking, drones are already technologically ready to be used massively for transportation or delivery of goods. However, regulations are still forbidding mainly due to the general public's low acceptance level. Research to develop human transporting drones which are commercially viable has been ongoing. A drone typically consists of the frame, flight controller, electronic speed controller, motor, propellers, power distribution board, remote controller and receiver. First person view (FPV) camera and collision avoidance system are also no longer uncommon in a drone.

Mr. Alvisse then highlighted the importance of air-worthiness, flight operation and operator qualification for a drone pilot. Pre-flight, flight, post-flight, maintenance and storage of drones are the core competencies of a drone pilot.

Regulations on how to control the recreational use of drone users have been drawn and it was indeed a challenging exercise to balance between innovation and regulation. He then listed down the ten rules proposed by MUDAS:

1. avoid flying more than 400 feet above ground level
2. always fly within line of sight
3. ensure air worthiness
4. keep distance from transmission lines
5. do not fly within 5 nautical miles radius of any airport
6. do not fly above crowded area
7. do not carry hazardous material
8. do not fly over restricted, prohibited or danger area
9. ensure radio frequency of the drone is compliant with MCMC regulation
10. Aerial photography needs permission from Department of Survey and Mapping Malaysia (JUPEM)

Mr. Alvisse ended his talk by highlighting the importance of considering drone insurance for protection against public liability due to potential personal injury and property damage caused by drones.

The next speaker was Mr. Khairul Ariffin who immediately shared the permit required for aerial photography which was issued by JUPEM which clearly specifies the time, date, maximum height and coordinates of the flight. Drones have transformed engineering in many ways. The global drone market is valued at billions of USD. Echoing with Mr. Alvisse, construction field has seen the largest growth in adoption of drones to perform various tasks such as project progress monitoring, site mapping and monitoring of workers' safety. Drones are also extensively used in Building Information Modelling (BIM). Drones are highly disruptive due to its cost, accuracy, timeliness and safe-to-use. He strongly advised any drone pilot to also have another spotter while operating a drone.

The actual talk ended within 3 hours. However, the last remaining hour was fully utilised by the participants who were extremely excited and curious about the topic. The photos below summarise the event of the day. Some of the participants also took the opportunity to operate some of the drones brought by the speakers.



strong crowd