Drönare – ett redskap i samhällets tjänst?

Actual UAV trends and coming applications

Pau Mallol



WHO IS PAU MALLOL?

- Entrepreneur
- UAV/Drone and drone systems developer
- Mine drone pilot
- 'Drone culture' speaker and promoter









THE DRONES PARADIGM

Its use and numbers of drones sold growing extraordinarily fast

DRONES in numbers SIZABLE POTENTIAL

\$20.6 billion

The global market opportunity for commercial drone sales. (p. 11)

The approximate share of the addressable global military UAV market we expect Northrop Grumman to capture. (p. 69)

EXPORT OPPORTUNITY

\$12.4 billion

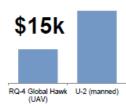
The potential export market between FY2017 and FY2021 for drones made by US defense contractors, (p. 64)

NASA: AIR TRAFFIC CONTROLLER

\$2.8 billion The amount NASA plans to spend over the next five years to develop a **UAV** airspace management system—an important requirement for broader commercial and consumer use. (p. 45)

COST ADVANTAGES

The cost per flight hour for Northrop Grumman's RQ-4 Global Hawk UAV. less than half the cost of the closest manned alternative, the U-2 spy plane. (p. 51)



MORE THAN JUST MILITARY

44.300

The number of land surveyors in the US, which we use as a proxy for UAV demand in construction. UAVs can help surveyors create 3D maps. (p. 18)

177k

The estimated number of days spent filming movies, TV shows and commercials in a year, where drones are increasingly likely to be on set. (p. 33)

6,000 lbs

The payload capacity of a K-MAX UAV, which could be used to transport supplies to firefighters in locations too dangerous for manned aircraft. (p. 47)

Equity research by Goldman and Sachs (2016)



WHAT'S COMING STRONG?

- Construction (surveying and mapping)
- Agriculture (precision agriculture)
- Oil and Gas inspections
- Journalism
- Real Estate
- Mining (3D laser mapping of inaccessible areas)
- Clean Energy (wind and solar inspection)
- Aerial video- and photography
- Delivery by drone (?)
- Insurance sector
- Disaster management and SAR



DISASTER MANAGEMENT & SAR

- Pre-event assessment/surveillance
- In-situ assessment of the event
- Post-event evaluation







DISASTER MANAGEMENT & SAR

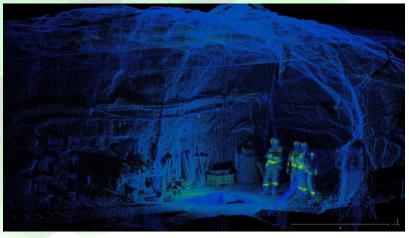




TECHNICAL CHALLENGES

- Intrinsic danger:
 - Kinetic and potential energy > parachute, lighter drones, sense and avoid systems
 - Propellers > protectors
 - Lithium Polymer batteries > Ion, hybrid, fuel cell batteries
 - Misuse > Educate in schools, regulate (?), control (transponders)
 - Co-existence with manned aerial vehicles







REGULATORY CHALLENGES

- We'll be soon 'surrounded' by drones and robots of any type (not only aerial)
- Drone market evolves much faster (technology, users, applications...) than law making.
- Lawmakers have three challenges:
 - 1. Understanding the actual technology and use
 - 2. Foreseeing the coming technology and use
 - 3. Elaborating the regulatory framework

NB: and all this should be within an international framwork

Regulation + educating today's children and teenagers



SOCIAL CHALLENGES

- The 'Drone culture': what is it?
- Drone education in schools:
 - How to use drones properly
 - Learn programming, mechanics, aerospace concepts too!
- News and media: too much about the negatives
- Society: too much misled by media news selection and topic

ignorance





THE FUTURE IS PRESENT













FINAL REMARKS

- Drones have still an untapped POSITIVE potential
- Education is key for safe and easier implementation of drones in society
- Technology development (SAA and collision avoidance systems) MUST be still improved > Tech companies need more money!
- For SAR and disaster relief use, government departments and agencies must be more proactive (we need to test in real scenarios)

Thank you for listening!



EXTRA SLIDES



VENTILATION SHAFT FLIGHT TESTS



(video link in picture)



THE DRONES PARADIGM

Exhibit 54: Estimated global 5-year UAV spending map and US export potential Key markets center in Europe, APAC, and the Middle East

