

Drones and Electric Cooperatives

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Imagine the Future

Imagine you are buying a new book on Amazon. It is a Sunday. You click the confirm purchase button. A couple hours later you hear the buzz of a little delivery drone outside your window. There is a jingle notification on your phone. Finally, you step outside to see your package delivered. This may seem like science fiction, but drone tech companies are working hard to make drone use a reality.

The Current State of Drone Interest/ Funding

Drones are one of the fastest up and coming technologies that could drastically change the future. What is most impressive is how quickly interest has grown. Figure 1 shows a data study from Alphasense. In this figure, the number of companies mentioning UAVs in 2010 has now doubled 2014.

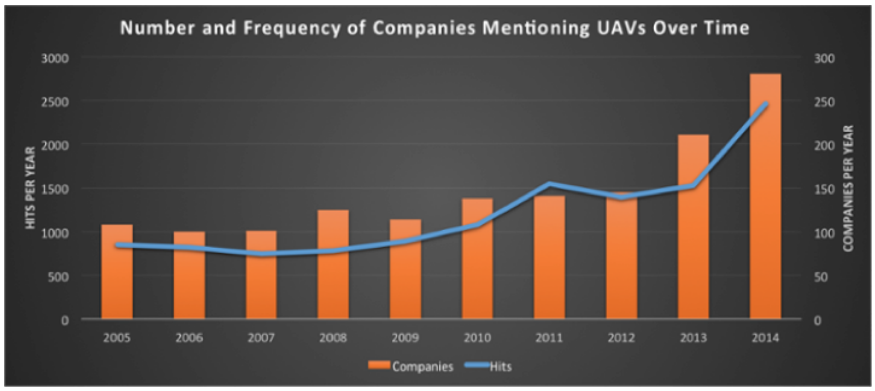

Figure 1: Interest in Drones

Drone interest is not only recent but a variety of sectors are interested in the use of drones. Figure 2 is another study from Alphasense. It may be surprising that most interest is from information technology companies. These IT companies include Semiconductor companies, IT services, hard and software businesses. Industrials mainly consisting of aerospace companies are a close second and were leading the charge until recently.

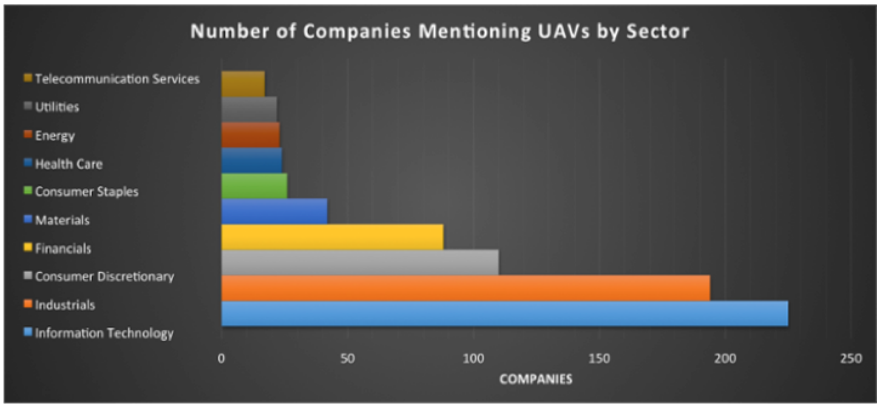

Figure 2: Companies Mentioning Drones

Drone funding is young but it is rising fast. In fact as late as 2012 there was nearly no funding for drone companies. Since then in 2014 funding has increased to over 108 million across 29 deals. Figure 3 is a data study done by CB insights.

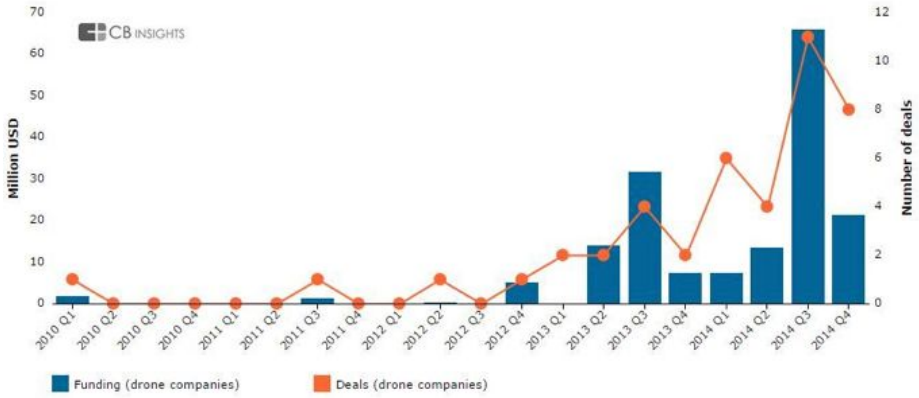

Figure 3: Funding and Deals involving Drones

It is important to note who the leaders in the sector are at this moment. Currently, Airware is developing a variety of drones specifically for commercial uses. Airware is not only leading the charge in technology but also in overall funding. Figure 4 shows the top 5 most well-funded drone startups as of 2014.

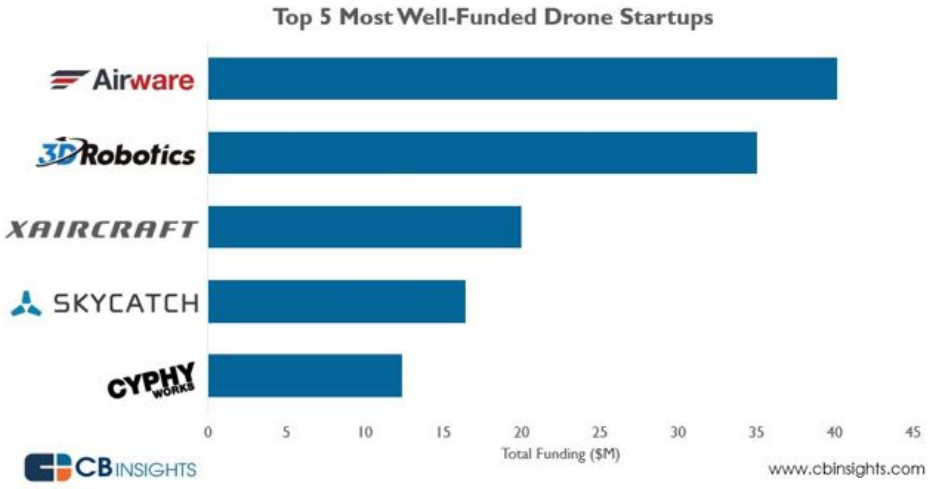

Figure 4: Most Well-Funded Drone Startups

Regulations

Today, drone regulations are a hot topic. The FAA is hard at work putting together regulations that will help protect people while giving drones some space to be utilized effectively. The FAA has already begun the process of developing some concrete regulations. The 60-day public comment period for the small UAS Notice of Proposed Rulemaking closed on April 24, 2015. Electrical cooperatives evaluated the proposed regulations and have also proposed changes. These proposed changes can be found at the link in the footnote[1]. The following is a summary of the proposed changes of drone regulations made by electrical cooperatives. Keith Dennis from NRECA has contributed to the amendments of these regulations.

Operation from a Moving Vehicle (107.25)

Cooperatives want to be able to operate their drones while sitting passenger in land vehicles. Cooperatives own long transmission lines and large solar and wind fields. Being able to operate from a car make things easier for workers.

Daytime Operations (107.29)

The FAA wants to restrict UAS use to the hours between official sunrise and sunset. When storms happen in the evening or at night it is important for cooperatives to get the electricity back on as fast as possible. Drones can survey for damaged lines very quickly. Being able to operate during nighttime hours would be useful to the cooperatives.

Visual Line of Sight (107.31)

As of now the FAA requires that an operator can see the drones at all times. This limits the use of drones greatly. The cooperatives would like an exception to this rule when operating in areas owned by the electrical cooperatives.

Operation over People (107.39)

The current regulation stands that drones cannot be operated over anyone not “directly participating” in the use of the drone. Cooperatives want to ensure that there is a clear definition of “directly participating.” Cooperatives would like to extend directly participating to those workers engaged in related activities such as workers at a power plant.

Operating limitations for small-unmanned aircraft (107.51)

This more specifically refers to the 500 ft. flight ceiling that the FAA has put on drone use. This can be a problem when some of cooperatives infrastructure rises well above 500 ft.

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1 https://www.cooperative.com/governmentaffairs/regulatoryissues/Documents/appa_eei_nreca_uas_comments_to_faa_4_24_15.pdf

The Future of Drones

Drone capabilities today are limited, but the possibilities for their future are plentiful. These possibilities are simultaneously exciting and troublesome. It is paramount that the FAA takes into account all the possible uses of drones when developing regulations. The following are a few interesting ways drones could be utilized in the future depending on how regulations and technologies develop.

One of the largest tasks the FAA has been given is looking at developing an invisible infrastructure for drones. This infrastructure includes the flight space where drones are allowed to fly. If GPS information were incorporated, Drones could then constantly update their GPS system. Drones would be able to distinguish their location and automate flight paths. However, this invisible infrastructure could easily be deeper. Drones capabilities could go as far as to recognize faces from a database and even evaluate facial expressions. Controlling how much data drones are able to tap into is vital in creating responsible drone use in the future.

The Scary

If allowed to go far enough drones could even play a large role in our lives. One possibility is where drones could be flying billboards that scan areas for target customers. The drones could evaluate facial responses to the billboard, gather data for responses to marketing ads. This data gives companies the ability to develop super effective marketing strategies.

Public service drones are another possibility. Drones that have the ability to give speeding tickets or search for on the run criminals. Not only would these drones take away jobs from the average American but also they could be used to gather additional data to send to “The Man.”

The Good

There is an incredible upside if drones can be used responsibly. One interesting use of drones is to replace Facetime or Skype. When families are separated and want to stay in touch Facetime and Skype are great tools. Drones could improve this by incorporating a hands off approach to Facetime where the drone simply follows the family around and records in the third person.

The follow function also has cool potential in sporting. Whether recording your team play soccer or snowboarding a half pipe. The drone bird eye perspective adds a whole new element in sports footage.

The two previous examples of good drone use don’t even go into corporate use.Corporation use of drones is really where drones could play a much greater role in our lives in the future. Drones offer the potential to lower cost and improve services in a variety of ways.

Drones and Electrical Cooperatives

Good news is that drones use by electrical cooperatives would be very benevolent. Using drones for simple tasks to minimize risk to workers and cost to cooperatives should not hurt anyone. It is the limiting of data collection by big companies, corporations, and the government that needs to be carefully monitored.

When it comes to the possible uses of drones in Cooperatives today, most uses are for visual inspection of lines and infrastructure. This includes assessing damage after storms, determining the scope of extensive outages, detection of right of way infringements, and vegetation management. These are critical uses for drones in cooperatives and can save cooperatives a lot of cost. For example, sometimes to do these types of inspections helicopters are used. If a little drone could be used instead of firing up large helicopter money, gas, and time are all saved. It is also important to note that with 4k resolution of cameras operators can now do nearly as good an inspection as if they were done in person.

There are a variety of different sensors that can be attached to drones. Thermal sensors on drones can help detect hot spots on wires. Radios frequency sensors can detect corona noise from arcing equipment. Ultraviolet cameras can also detect corona or arcing.

Two primary type of drones currently being used. There are Quadcopter drones. Quadcopter drones are what the research sector for commercial drones is focusing on. Quadcopters have the advantage of being able to hover in one place and take still video. They are also good for high altitudes and can carry a heavy payload relative to their size. Predator style drones or fixed wing drones is the other type. These drones can travel very long distances at relatively low cost. Predator style drones can also travel more quickly than copter drones. The difficulty with predator style drones is that they are harder to use.

The Near Future of Drones and Electrical Cooperatives

Now for looking into how drones could be used in the future at cooperatives. The programming of drones could be very useful to cooperatives. Programming drones to take predetermined flight paths to scan an area. Then drones could be sent out more consistently to do inspections and reduce problems or issues in the electrical power system.

Researchers are also developing sophisticated crash avoidance techniques. This is important because safety is always a key issue at cooperatives. It also would make the operating of drones very easy, especially when combined with the programmable flight paths.

Increasing the use of drones can take away jobs from the hardworking men and women at electrical cooperatives. A possible way to sidestep this problem is to train more workers in the operation and programming of drones.

Conclusion

Drones are a hot topic at the moment. It is hard to say how much of a role they will play in our lives in the future. However, drones are definitely here to stay. Some crucial questions are what regulations will the FAA put in place? What technology will be developed that haven't been considered? How much drone usage does the American public feel comfortable with? Drones and cooperatives seems like a very logical relationship. At cooperatives drones can provide many services without falling prey to their inherent dangers. It is exciting to think how drones could change the future of cooperatives for the better.