Droning On – Et Tu Icarus?

While drones have been around for several years – from our first public knowledge of sophisticated ones seen in use in the Afghan and Iraqi war zones – the technology used to make them more than just model aircraft has made it to a relatively inexpensive commercial and consumer markets, and with that, the use has blossomed. However, this rise in availability, lowering of cost, and general use has not been without some controversies and other issues.

The use within the non-military environment has been extremely varied, but still leverage the ability to allow for remote piloting and primarily to gain vision into and over areas that are too hard or unsafe for human-piloted aircraft to reach. In cases such as this, they've been leveraged for surveying, herd management, filmmaking and television, and in some cases law enforcement. My own first experience with a traditional drone (not just a model aircraft from which they offer a lineage to) was at a Federal agency where part of their work is to assist law enforcement with surveillance and interdiction activities. This looked like a model airplane but with cameras, and was build by one of the larger government aerospace contractors. Now drones are built and sold by a myriad of companies, and can be found in toy and electronics stores for a few hundred dollars ranging up to a few thousand depending on flight time, control capabilities and other add-ons to the platform. The FAA and some other regulating Federal agencies have been examining this growth carefully and have attempted to keep pace with this expansion.

Current Commercial Exploitation

Amazon recently proposed to the FAA, a lower area of the public airspace to use for drone flights, purportedly to assist in their plans for a delivery service based on such technology[1]. That news was met with some fascination as to "are we actually there yet," and incredulity as to "do we want our skies buzzing with the sounds of drones?[2]" As cool and novel as this may sound to deliver products on-demand from distributor to consumer, it may actually be less efficient than current methods of package handler such as UPS, FedEx and Lasership, who gain efficiency through a one-to-many delivery architecture on the last mile, but may suffer in only expediency. It may be a solution in search of a problem, much in the same way that the backlash against "service" startups[3] like Uber, Postmates and Washio are trying to appeal to a certain consumer at the cost of traditional service delivery methods, usually at a premium, but possibly not enough to justify the cost of the novelty for many[4].

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[1] http://www.engadget.com/2015/07/28/amazon-proposes-a-delivery-drone-flight-plan/

[2] http://www.industryweek.com/safety/incoming-amazon-wants-air-space-drone-delivery

[3] http://sfist.com/2015/07/23/your_uberx_driver_is_also_probably.php

[4] http://mic.com/articles/123311/silicon-valley-white-male-privilege-class-war

Drones aren't just for getting you your media to your doorstep faster, as there has been a boom in other commercial uses of these capabilities. Twentieth Century Fox recently turned to flying a drone that was shaped like Johnny Storm of the Fantastic Four and lit on fire to promote their upcoming film about those same super heroes[5]. While not possibly the safest or most practical use of such technology, I garnered enough social media mentions to indicate some level of success for their marketing team. To continue with the use of drones in the entertainment industry, some of the first flight exceptions granted by the FAA[6], out of over a thousand now published, were for film and television support work, and additionally to support that as a branched activity, to also provide other ways for journalists to report on events. Beyond commercial entertainment, the leveraging of drones at an industrial scale for observational platform purposes can be used for inspection (such as pipelines, electrical and telephone transmission wires, land surveying, insurance claim assessments, or agricultural plots)[7] allowing greater reach and ease of access where it might otherwise be difficult, cumbersome, or expensive[8]. As most drones are able to be programmed just as easily as they may be piloted by a human, pre-programming patterns to collect this data and other information may have the side effect of significantly reducing cost, increasing the quantity and quality of data and increasing safety.

Prison Drug Drop

Recently, the Internet was a-stir with the news of a drone drug drop into a Mansfield, Ohio prison yard that resulted in a "free for all" brawl among inmates scrambling for the stash[9]. It was noted, that upon review, there had been several over flights, but guards paid no notice until they were caught on review of surveillance footage. This does bring up concern about the security of airspace over sensitive areas, such as jails and other ground-access restricted spaces that now have to worry about air incursions. The issues, though, may not be as easy as a policy or regulation, as the FAA has been slow to not only clarify their rules, but the market itself has exploded in that access to the technology requires a few hundred to a few thousand to get a drone or drone-like technology flying and capable of such tasks as identified above. Much as drones are used by law enforcement for interdiction and surveillance, criminals and others can case targets or provide other support using similar techniques[10]. The U.S. Department of Homeland Security (DHS) had recently released a memo warning citizens and alerting law enforcement

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[5] http://gizmodo.com/the-blades-are-the-least-dangerous-part-of-a-flaming-hu-1722013940

[6] http://dronelaw.net

[7] http://www.cbsnews.com/news/6-ways-drones-will-transform-business/

[8] http://dartdrones.com/commercial-use-of-drones/

[9] http://www.dispatch.com/content/stories/local/2015/08/04/drone-drops-drugs-in-Ohio-prison-yard.html

[10] http://ideas.ted.com/attack-of-the-drones-a-view-from-the-unfriendly-skies/

to potential use of drones in terrorist activities[11]. As reported globally[12], this isn't an issue or concern only for the United States, as the ease-of-access and use of technology are inspiring people to find novel and unique ways of using drones[13]. In many cases, new technologies will need to be developed and deployed to address those who violate regulations and no-fly zones (NFZ)[14], potentially virtual fencing and other counter measures – however this will be difficult and impractical to do universally, let alone predict targets and prioritize deployment of such systems.

CA Firefighting Incursions

On multiple occasions this Summer, firefighting crews in California have had to reroute or cancel some air support activities due to drones being spotted in airspace around forest and brush fires. In one case, very publically, crews had to divert a tanker that was set to dump retardant on a fire that overran parts of Interstate 15, which had destroyed seven homes, 16 outbuildings and 64 vehicles, including 2 semi-trucks, most of which were on the Interstate at the time[15]. Reports indicated that the incursion halted fire management attempts by air during a critical half-hour period early in the fire's life. Several weeks earlier, in a less densely populated area, U.S. Forest Service had to halt similar air operations due to drone flights, and after the event issued a public awareness campaign including flyers and social media efforts[16]. In both of these cases, not having such air support put surface-based firefighters at risk[17]. In both cases, not only were the drones in an area that had temporary flight restrictions (TFR) issued by the FAA they were at altitudes higher than allowed for such aircraft, roughly 1200 feet instead of the approved 400[18]. Unlike current basic rules for drone use in more populated area, such as avoiding locations near airports, hospitals, and other dense locations where people and aircraft may come into contact, the areas over which these drones were scene, technically fall under safe places to fly if the TFRs were not in place.

Drone Vigilantes

[11] http://arstechnica.com/tech-policy/2015/08/homeland-security-hobbyist-sized-drones-are-the-latest-terrorism-threats/

[12] http://www.ibtimes.com/terrorist-drones-could-target-airports-sensitive-us-sites-dhs-warns-after-isis-attack-2037680

[13] http://www.coha.org/worst-case-scenario-the-criminal-use-of-drones/

[14] http://www.nytimes.com/2015/01/28/us/white-house-drone.html

[15] http://randomramblingsfromnj.blogspot.com/2015/07/more-on-unmanned-aircraft-systems.html

[16] http://arstechnica.com/tech-policy/2015/06/drone-flying-over-forest-fire-diverts-planes-costs-us-forest-service-10k/

[17] http://www.sacbee.com/news/state/california/fires/article27021067.html

[18] http://www.extremetech.com/gaming/209020-hobbyist-drones-force-tankers-to-abandon-wildfire-fighting-efforts

There have been a few sides to the use of drones, now that the public has become aware of them. Their first use, particularly in military spheres, are often viewed as armed faceless remote surveillance and killing machines. Mental imagery aside, paralleling the rise of SkyNet in the Terminator franchise, these activities were guided by a remote pilot with specific instructions on to what to target and how to complete the mission. Most personal uses of this technology still require the same type of control by an individual behind the controls, but the motivations for their use and flight paths don't always steer on the side of best intentions. With that, they've had their fair share of critics – including those who take matters into their own hands.

Besides the recent news about incursions into air support operations, the other hot item in tech circles when covering drones has been the vigilante aspect of people shooting them down[19] for one reason or another[20]. The legal reading on this is a bit murky, since case law isn't specific or modernized enough to address drone-related events. These instances where action to take out a drone have also been varied in outcome – ranging from arrest of the shooter, to nothing at all by citing self-defense and trespassing statutes – and start to step into the realm of having to develop laws and policies that address human interactions with robots, of which drones are often categorized into. As noted, the FAA considers these drones, through regulation, as aircraft – however, they are also using FCC controlled spectrum for their radios, and potentially come under jurisdiction of other agencies depending on their motion and use. Recently this question of legal issues were raised in a similar "robot rights" incident where a Canadian hitchhiking robot which was let loose on the Eastern Seaboard in an attempt to go across country, but was vandalized a few hundred miles into it's trip somewhere in Philadelphia. Are these robots, when piloted by a human, just property, or when they go autonomous, do they have rights as would humans and other living entities have and be protected by? The Federal regulatory bodies charged with developing policy are behind in addressing this, as exploitation and innovation of this technology far outpaces their ability to keep up[21]. At least with drones, the FAA has engaged, collaboratively, with industry and consumers to "suss out" the needs and potential use cases of such technology so that adequate and sufficient regulation can be developed to keep pace with the burgeoning technology, even in considering of partnering with other regulatory and enforcement agencies to ensure that the work done is comprehensive.

Drones for Disney

So, with the mixed bag of commercial use applications and the recent "higher than usual" profile of drones in "all the wrong places", plotting a potential course forward is scattershot at best. There is no doubt that drones will continue to be leveraged in the traditional roles for film and television production, as well as the potential

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[19] http://www.vox.com/2015/7/31/9078383/drone-shooting-privacy-kentucky
[20] https://www.schneier.com/blog/archives/2015/08/shooting_down_d.html
[21] http://dupress.com/articles/us-regulatory-agencies-and-technology/

exercise of the drone puppetry patent granted to the company a several months ago[22] in service of entertainment for guests at parks and resorts. However, much as they are used in these manners, we still have our guests to consider in their use. Much like "selfie sticks" have been banned from Disney resorts, there may be a time soon where drone operation, legal or otherwise, will need to be addressed from the guest relation standpoint.

This is, however, one technology on its own; really amazing innovations usually occur when you can combine several pieces of technology to solve a problem or launch an idea. Will there be a way to take some of the ideas launched in Disney Research or Imagineering and find a greater practical application when combined with drones? Can we solve the wireless communication issues by leveraging drones as on-demand surge Wi-Fi or cellular hot spots to increase capacity, or take an application from another industry utilizing drones, such as safety inspection, and use it to assist in surveying our rides and other facilities? This will take identifying the challenges we have and a wider view of the technology portfolio out there to solve them.

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[22] https://www.washingtonpost.com/news/the-switch/wp/2014/08/27/disney-filed-a-patent-for-blimp-sized-puppets-controlled-by-drones-but-that-doesnt-mean-theyll-be-in-parks-soon/