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GEOG 270 – Introduction to Small Unmanned Aircraft Systems

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### Drone Applications for Construction and Real Estate

Drone technology is revolutionizing the construction and real estate industries and will be the primary driver that shapes business practices in the next decade. Drone technology is being used to save time and increase efficiency while simultaneously providing better data for end-users and customers. As technological capabilities increase for small unmanned aerial vehicles (sUAV's) more development and management companies will rely on drones as a key aspect of business models.

Construction trends over the last few years have changed dramatically with increased sUAV capability. Some segments of the construction industry have experienced a 239% increase in drone usage.<sup>1</sup> Although initial uses were solely for aerial imaging, the market has expanded well past a single purpose. Drones are being utilized for site surveys, mapping applications, equipment tracking, workplace safety, marketing, and building inspections. The potential uses of drone technology are only limited by the imagination of the workforce.

The advantage of aerial photography goes without being stated. The benefit of gaining a 'birds-eye' view of a job site before, during, and after construction are immeasurable. The technology allows more precise land surveying than previous methods. By implementing sUAV's, users are no longer limited to conditions on the ground when surveying sites.

Vegetation, adverse land conditions, and challenging topography are no longer limiting factors in getting a proper land survey. Instead of sending out crews of workers to clear paths, the drone is

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<sup>1</sup> Stannard, Liam. (2018, October 09). 6 Profitable ways Drones in Construction are Changing Projects. *Big Rentz*. <https://www.bigrentz.com/blog/drones-construction>

a massive time and labor-saving tool while allowing the user to gain a better overall picture of the landscape through imaging tools. Drones can not only provide real-time views of the landscape but can also record video for the imaging to be relayed to clients, architects, and other industry officials for the planning and execution of projects.

The imaging plays a key role in real estate by being able to show a full picture of land and property. It provides professionals with better information regarding a property which assists in evaluations and marketing to potential investors. Also, the use of drones is extremely more cost-efficient than previous methods of property inspection. sUAV's are increasingly being used in the commercial real estate industry. Using drones to inspect everything from roofs on single-family dwellings and small businesses to more expansive buildings such as high-rise apartments and office buildings can save up to thousands of dollars for property inspections. sUAV's are much more efficient than time and costly methods of labor and equipment used to do the same level of inspections. Drones can be set up and flown to scan hard to reach places in a sliver of the time it would take manually with labor, thus creating tremendous cost savings.<sup>2</sup>

The coronavirus has enormously impacted the drone industry concerning the commercial real estate sector. As 2020 progressed, in-person meetings and conventional methods of conducting business deals became severely limited, and in many cases, altogether halted.<sup>3</sup> Drone technology has enabled investment firms to still show their clients properties even though meeting in person is constrained. By using sUAV's to provide imaging of properties, clients feel more comfortable proceeding with business deals. This will likely be a continued trend in the

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<sup>2</sup> Verma, Urvashi. (2018, August 31). Drones Cutting Property Inspection and Maintenance Costs for Building Owners. *In-Building Tech*. <https://inbuildingtech.com/aerial-drones/drones-office-building-inspections/>

<sup>3</sup> Nagarajan, Shalini. (2020, November 26). Goldman Sachs Has Been Employing Drones to Get a Close Peek at Potential Bids Before Sealing Billion-Dollar Deals During the Pandemic. *Business Insider*. <https://www.businessinsider.com/goldman-sachs-drones-potential-billion-dollar-deals-2020-11>

future as companies look to slash budgets and increase efficiency. By eliminating costly flights, hotels, meals, and other travel essentials in favor of drone technology, the buyers and sellers can still proceed with confidence based upon the work of a drone, which can be done without violating social distance rules.

Drones are proving to be much more efficient than old methods of surveilling construction sites. With real-time data recording and unique aerial advantage, drones can improve efficiency, cut costs, and streamline workflow. Drones survey vast acres of land in just 15-30 minutes, saving up to 20x costs in creating topographic maps. Drone software is inserted into mapping programs for 3-D analysis which assists in planning projects and is essential to projects of all scales.<sup>4</sup> The capabilities are also revolutionary as they can help identify potential issues before the construction phase of a project, saving time and money for both the contractor and the client.

Drones can cover the area much quicker and make more precise measurements backed up with pictures and videos for the clients. It is a much more efficient method of inspecting previous hard to reach places and great heights. Drones can capture considerably more detailed pictures and images and pictures not possible on cranes, helicopters, and other methods previously used.<sup>5</sup> Drones help replace massive machinery and bulky, difficult to assemble scaffolding and bulky ladders are sometimes required to be placed on uneven ground, thus directly impacting worker safety. Thermal sensors can detect heat leaks, cold spots, and any electrical issues compromising safety to the client and community.<sup>6</sup>

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<sup>4</sup> Stannard, Liam. (2018, October 09). 6 Profitable ways Drones in Construction are Changing Projects. *Big Rentz*. <https://www.bigrentz.com/blog/drones-construction>

<sup>5</sup> Goodman, Jenn. 20 January 2020. "Tech 101: Construction drones". Construction Dive website. <https://www.constructiondive.com/news/tech-101-construction-drones/569796/>

<sup>6</sup> Stannard, Liam. (2018, October 09). 6 Profitable ways Drones in Construction are Changing Projects. *Big Rentz*. <https://www.bigrentz.com/blog/drones-construction>

Perhaps most importantly is the value drone technology is having on worker safety. The inspection capabilities drones offer all but eliminate some of the most dangerous aspects to both construction workers and real estate professionals. Having to reach sometimes great heights at uncomfortable angles for inspecting property has always been one of the most hazardous parts of the inspection process. Drones reduce the risk of injury and death related to manually inspecting the exterior walls of high-rise buildings, a method until recently required by an inspector to repel down the side of the building suspended by ropes and pulleys.<sup>7</sup>

Drone technology has increased productivity by having a drastic effect on communication capabilities. One major way they assist communications is the ability to transmit live feeds of the job site to other places in situations where everyone involved in a project is not co-located. They feature cameras with live video footage for communications and surveillance, ensuring rapid speed of information delivery.<sup>8</sup> This capability also assists in worksite security. Construction sites have long been known to be vulnerable to theft and vandalism. Drones delivering live feeds to headquarters ensures a level of security without the added cost of adding personnel to patrol the grounds after working hours.

A potentially exciting area in the future is drones connected to artificial intelligence. As the technology develops, it may be possible soon to equip drones with tools and program them to follow out repetitious work, such as nailing boards to a wall for example. It is easy to conceive of the advantages this type of technology could have when considering the difficulty in some construction jobs such as nailing on a roof or high ceiling. The tradesman would not be replaced

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<sup>7</sup> Verma, Urvashi. (2018, August 31). Drones Cutting Property Inspection and Maintenance Costs for Building Owners. *In-Building Tech*. <https://inbuildingtech.com/aerial-drones/drones-office-building-inspections/>

<sup>8</sup> Burger, Rachel. (Updated: 2020, August 15). 6 Ways Drones are Affecting the Construction Industry. The Balance. <https://www.thebalancesmb.com/drones-affecting-construciton-industry-845293>

in this example but would be integral in helping to program and control the drones without the timely set-up of cumbersome equipment and the risk to their safety.

There are some obvious concerns with emerging drone technology. Firstly, privacy is a major concern. In using drones for inspection, privacy bounds can be easily crossed even accidentally. Inspecting a home could potentially lead to inadvertent spying on a neighbor. Using drones for commercial building inspections could accidentally lead to proprietary information being leaked. There are also many potential hazards. A drone operator could lose control of the drone and cause damage to persons or property. A drone could malfunction and cause damage or fly in restricted zones. There could be a myriad of issues and to this point, the technology and usage have outpaced legislation. There are also concerns that sUAS equipment could become advanced to the point where employment is lost for people.

The sUAS drone market in construction and real estate has untapped growth potential soon. Drone technology is advancing quickly and, aided by the new social distancing norms due to the COVID-19 pandemic, is becoming extremely popular in the construction and real estate industries for the efficiency of use and cost savings. Although there are issues still to be addressed, drone usage will continue to be a transformative tool increasing safety, proficiency, and communications on work sites for years to come.

(1470 words)