The Potential Impact of UAS Technology in Pre- and Post-catastrophe Situations

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Current climate of Commercial UAS use

Unmanned aerial systems (UAS) traditionally have been used by the military but are quickly becoming increasingly more attractive for use in commercial applications with huge potential being recognized in pre-and post-catastrophe situations. Industry interest in UAS and the emergence of the technology is rapidly expanding but there are challenges that need to be overcome before it becomes standard operating procedure in the event of a disaster.

Currently, the use of UAS in commercial applications is only allowed with an exemption from the Federal Aviation Administration (FAA) under Section 333 of the *FAA Modernization and Reform Act of 2012* (FMRA).

The FAA is currently developing the regulatory framework to safely integrate small UAS into routine National Airspace System (NAS) operations. Under this section, the FAA Secretary can decide whether to grant an exemption if the UAS will not pose a hazard to users of the NAS or pose a threat to the public or national security.

The FAA has a five-year UAS roadmap in place for the integration of Civil UAS into the NAS as required by the FMRA of 2012. The popularity, use and sophistication of UAS is significantly increasing at a rapid pace with little compliance or oversight. For example, the manned aircraft industry is subject to standardized design specifications to ensure safe operations whereas the unmanned industry does not have any design or safety standards. This makes it challenging to apply basic FAA guidelines to the civil UAS industry.

Interpretation of regulations and standards needs to be reviewed and addressed by the FAA with the input and support of the commercial user community. It is critical for the FAA to understand the various implications and different uses for each industry and it can only do so by working closely with potential commercial users.

This is where industry collaboration groups, such as the recently formed Property Drone Consortium (www.propertydrone.org), play an important role not only as a conduit to governmental agencies such as the FAA, but by also investing in research and development of commercial solutions that meet strict standards for safety, operations and technology.

Pre-catastrophic event use of UAS

One of the most appealing and beneficial potential uses of UAS in pre-catastrophe applications is for inspections. In past years, the only way to inspect the condition of a property was to send an inspector to the site. Within the last 15 years, the shift has been to utilize high-resolution aerial imagery captured by manned aircraft equipped with special cameras.

Pictometry International Corp., an EagleView Technology Corporation company, pioneered the aerial image capture industry with the development of Intelligent Images® – those captured at a 45-degree angle with each pixel georeferenced in order to be actionable. The company provides analytical tools that allow users to extract data from the images as well as perform basic measurements.

Used across the country initially by county governments, including tax assessors, public safety officials, GIS specialists and more, Pictometry imagery has become a staple in other industries such as insurance, construction, infrastructure and real estate.

Current image technology in manned aircraft allows for the capture of images at a ground sample distance of one-inch per pixel. While this level of clarity provides an excellent level of detail for identifying properties, hazards and understanding surroundings it also is somewhat more cost prohibitive as it requires lower, slower passes from the aircraft.

The use of UAS in pre-catastrophe inspection offers tremendous potential at significantly reduced costs. Companies can gain valuable knowledge about properties and assets and assess their integrity and ability to weather a catastrophic event. The insurance industry could easily and quickly assess a property and risk factors surrounding it at the time of underwriting an insurance policy or reviewing one for renewal.

An electric utility could examine its assets such as poles and look for encroachments that could pose a hazard such as tree branches that could bring down wires in high winds. Engineers could prepare and identify infrastructure such as bridges, levees or dams that need attention in order to withstand a severe event. Emergency Operations Centers may be able to cost effectively have access to very current imagery of their entire jurisdiction and all critical areas.

These uses are exciting and may seem easy to implement but it's important to remember that the technology behind the UAS and its cameras are vital to capturing high-resolution, georeferenced accurate information and data. There are many hobbyist videos available on the Internet that

demonstrate why not all UAS are ideal for pre-catastrophe use. Images often appear with a fish-eye effect, flight paths are often not smooth in the case of video capture and beyond a visual view, there is no ability to extract data such as property owner, elevation, etc. – information that is vital to effectively allocating and staging resources in the event of a disaster.

EagleView Technology Corporation's goal through the formation of the Property Drone Consortium is to leverage the patented technologies developed by Pictometry over the last 15 years to develop UAS systems and software solutions for interacting with the images and data that meet the needs of various industries including insurance, construction and government.

Potential of UAS to save lives in impending catastrophe situations

The research and development efforts of the Property Drone Consortium will include examining how the use of UAS could potentially save lives when an impending catastrophic situation exists. In instances of severe weather, such as tornados, UAS may one day be able to be in the air in relatively close proximity to a tornado. This could allow for the transmission of real-time data to emergency operations centers and meteorologists on the ground. Vital information could be communicated to the public on the path of a tornado.

In the case of wildfires, where it may be too dangerous for manned aircraft to gather images and data regarding the path of a fire, a UAS could provide detailed imagery, video and life-saving information to firefighters on the ground below. That data and imagery could allow them to accurately and strategically set the proper fire breaks and position resources in the right locations to stop the fire and save homes and lives.

Post-catastrophe UAS scenarios

The use of UAS in post-catastrophe situations will significantly change emergency response and recovery efforts. Currently, following a disaster, the FAA typically closes airspace in the area until it deems that it is safe to fly manned aircraft. Typically the Civil Air Patrol is the first cleared to fly. Pictometry is currently working with the Civil Air Patrol on a Real-Time Air Management System (RAMS) that features a camera system mounted on Civil Air Patrol planes that transmits images and data in real time to an operations center on the ground.

Because the UAS is unmanned, the potential exists for it to get into the airspace over a disaster-stricken area even sooner. This means that emergency responders can efficiently allocate resources, determine if there is a need to recruit additional resources and identify access points and areas in need of more immediate response.

The information provided by the UAS can help utility companies visualize the extent of damage and prioritize their crews to restore power to the area faster. Disaster relief organizations such as the Red Cross will have increased response time when they have a full understanding of the damage and most immediate needs of the community.

The impact goes beyond initial emergency response. Data and imagery gathered by the UAS post-event will aid insurance companies in determining whether to call a CAT without waiting to rely on feedback from a boots-on-the-ground team conducting physical inspections. This means that homeowners and business owners will have faster resolution of claims through immediate aerial inspection of damage.

Benefits extend to the construction industry that will rebuild the community and repair damage. Building product manufacturers can understand the extent of damage to the particular area and adequately adjust production to meet demand as well as determine whether warranties should be honored.

Making UAS in pre- and post-catastrophe a reality

There is still much work to be done before the use of UAS in pre- and post-catastrophe situations becomes a reality. The Property Drone Consortium is the first step in bringing the industry leaders together to promote research, development and the establishment of regulations for the use of UAS technology across the insurance and construction industries. The consortium supports:

- The research and development of hardware and software solutions for unmanned aerial vehicles and systems
- The regulatory approval for the use of drones in the insurance and construction industries
- The facilitation of property data gathering through drone usage
- Activities and transactions to promote and legislate the use of drones for insurance and construction purposes
- The use of drones to collect data for property condition and damage assessment

The consortium's goal is to develop property-specific hardware and software solutions in 2015. Chris Barrow, EagleView CEO and president, chairs the not-for-profit, research LLC consortium and is confident of the group's ability to deliver. "We believe EagleView's twenty years of developing aerial solutions that capture property information, coupled with the expertise of the charter members in property conditions, claims and underwriting disciplines, will enable the consortium to provide strong and stable information and education to drive regulatory change and development of the usage of drones for data collection throughout the insurance and construction industries," explained Barrow.

Charter members of the consortium include industry leaders such as Allstate Insurance Company, Erie Insurance Group, Nationwide Mutual Insurance Company and the Insurance Institute for Business and Home Safety.