Proposal

Combating Negative Views of Unstaffed Aerial Vehicles

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Abstract

Implications of a negative perception of unstaffed aerial vehicles will presented in this research. Political issues including lawmaking are analyzed to understand the potential impacts of policy in regards to UAV technology. Positive uses and innovative research techniques focusing on UAV use are also discussed.

The evolution of the UAV has gone through many steps. Modern development of UAVs began in the 1930's. The original drones were not technologically advanced enough to make a significant impact on our way of life. The early hardware was designed to answer questions like, "Can an airplane fly without a pilot?" These types of questions were posed by scientists following their instincts for scientific exploration. Building model airplanes controlled by remotes was viewed as a hobby, not as a ground breaking technology. These hobbyists were pioneers in the UAV world. This group clearly answered the first question with a resounding "yes." Today's questions are more like, "How can we make sure the government doesn't use drones to spy on us?"or "Are we protected from abuse if federal agencies incorporate this technology into their culture?" These questions are appropriate for their respective eras. The mysteries of the future have not yet been solved and will not be definitively answered for many years to come. This uncertainty heightens researchers desire to pursue more positive uses and aids lawmakers in formulating appropriate regulations.

Congress and the Federal Aviation Administration are currently drafting the guidelines and restrictions that will govern the use of remotely-piloted and autonomous aircraft. It is critical to the future innovations of UAVs that a positive perception is maintained while these laws are being finalized. These regulations will be aimed at utilizing this powerful technology while keeping the American public safe and secure. Negativity surrounding UAVs threatens to increase the restrictions placed on the technology which in turn would slow the potential positive uses from being developed and implemented in society. This being said, it is critical to expose everyone to the positive side of UAVs to ensure informed decisions are being made in regards to actions that would affect positive

developments of this technology.

The governmental use through the military during the war in the middle east signaled the age of the drone. Unfortunately, the positives were overshadowed by the atrocious use of UAVs to eliminate suspected targets whether they were innocent civilians or hardened terrorists. Collateral damage by way of civilian casualties is unacceptable. The mere fact this occurred has forever tarnished the reputation of both UAVs and the United States government. What many people may not realize is that the UAV's primary role in the conflict was tactical reconnaissance and general observation. The wide spread use of this technology to end human life was irresponsibly destructive and beyond the scope of what scientists intended this technology to be used for. It is a fact that mistakes have been made and innocent people have been harmed, however, the military made an attempt to minimize the damage.

> At the Combined Air and Space Operations Center, Middle East, a military lawyer (judge advocate) is always on duty to provide advice reflecting the Law of Armed Conflict, the international treaties that prohibit intentional targeting of civilians and require militaries to minimize risks to civilians.(Sluka, 2013, p. 90)

Sluka goes on listing many statistics condemning the UAV campaign. The preservation of American soldiers' lives is not in his statistics, nor are other positive uses mentioned in his article. Monitoring the enemy's movements and locations is critical to mission success. This knowledge also minimizes the threat of casualties to allied forces. The U.S. government could have used the UAV to help the innocent by tracking relief supplies or even delivering them to the refugees in this war torn area. These types of missions are examples of ideal uses for this

powerful technology. They also would have increased positive public perception.

With scars still fresh from the war in Afghanistan, the UAV remains a hot topic. The current concern regarding drones is governmental abuse of privacy rights of citizens by monitoring the general population. This practice was refined to perfection during the military use of drones in the middle east. The media firestorm surrounding this topic is swaying the perception even further to the negative side. Politicians are also voicing there opinions:

> Kentucky Senator Rand Paul's March 6 filibuster stoked fears of domestic drones assassinating American citizens while they sat sipping coffee at Starbucks. Paul's dystopian scenario of a future Hitler-like president with a fleet of drones to do his bidding aside, his 13-hour ramble did serve to thrust drones into the spotlight.(von Wodtke, 2013, p.22)

This potential misuse forces the public to lose sight of many of the potential benefits. This type of publicity also increases the pressure on lawmakers and regulators to enact measures of strict control over the technology. The perception problem surrounding UAVs is not limited to the US government:

> As one of a handful of nations flying armed MQ-9 Reaper UAVs, the UK. has found its efforts blighted by associations with the US, armed services and intelligence agency operations striking at suspected terrorists in Pakistan and elsewhere, perceived breaches of international law and sentiment that aircraft like the Reaper and the soon-to-be-introduced Thales Watchkeeper system are technologies out of control. (Osbourne, 2014, p. 20)

This statement shows that the negative perception is global. It follows that the economic impacts both positive and negative will also be global. Having said that, and considering the current state of global economics, we can not afford to disregard the positive uses that will spur a global market for this technology.

Coming back home the laws regarding the airspace over the continental United States concerning UAVs are still open for debate. These laws will dictate where and how this technology can be used. The potential restrictions could slow the advances of this sector. Companies trying to utilize this technology in innovative ways will have to weigh the risk of losing research and development cost if their ideas do not coincide with upcoming regulations. The potential negative PR a company can acquire by jumping on this bandwagon also needs to be addressed. This topic parallels the main difficulty facing UAVs. If the perception of UAV technology is generally perceived as negative, then all entities associated with them will have that negative perception projected on them as well. There will need to be enforceable laws even if they are drafted with negativity clouding them. The regulations will have to address some of the basic logistics of using UAVs. UAVs will need to share air space with commercial and private flights. This characteristic of drones is an obstacle which will need to be sorted out by the FAA. Advances in GPS integration and radar upgrades should allow for this joint use of airspace. Altitude limits and no fly zones will also help this transition.

The safety of individuals that operate around drones is also an issue that needs to be addressed. There are many commercial-style robots that perform specific functions throughout the manufacturing and production industries. Many of these autonomous

machines are not people friendly. The speeds and force levels that these tools are capable of are not conducive to close human interaction: "simple safety measures are used in these kinds of environments where robots are stationary, like physical barriers". (Wong, 2012, p. 39) These barriers don't allow people to enter the operating radius of the robot. Sensors are another way in which people are kept safe. An example would be if a person happened to come within ten feet of an autonomous machine an automatic shut down procedure would instantly disable the device. These sensors have been developed over many years as these robots have become more common place. This type of sensory technology will also help make autonomous flying machines more safe. The fact that UAVs operate above the ground supports this, every object in the sky is considered an obstacle so the sensors can focus on avoidance instead of categorizing.

These sensors have been refined, "By linking wireless sensor networks and robotic automation systems, UAVs can change the way we collect field data, monitor field equipment, and even operate agricultural machinery".(Ehsani, Maja, 2013, p. 18) The potential for UAVs to be used in agriculture is astonishing. Pest monitoring, drainage mapping, and yield estimation are only a few of the potential uses list by Ehsani and Maja. A positive image should begin to form when UAVs are considered to be able to help maximize our food supply. Populations are on the rise across the world, UAVs could play a pivotal role in ensuring food supplies do not decline from where they are. The University of Florida Institute of Food and Agricultural Sciences Citrus Research and Education Center is experimenting with a UAV fitted with a special camera to monitor citrus disease and tree stress. (Ehansi, Maja, 2013, p. 19) What if we could dramatically reduce fertilizer usage by

increasing the accuracy with which it is applied? This would in turn reduce run off throughout the mid-west and in other countries where ground water is a prized commodity. Would this be enough to sway the opinion of the people in regards to UAVs? What if a measurable increase in agricultural production due to UAVs reduced famine in the world? Would that be enough good?

That was an example of direct monitoring, indirect monitoring of the way people affect the planet is another use of the UAV. Atmospheric monitoring is being performed using UAVs with special sensors. UAVs have the special attribute of being expendable without danger to human life. This is often the key to data retrieval in dangerous situations. Rogers and Finn give some good examples of this when describing how they used UAVs in their research, "dangerous environments (such as near hurricanes, cyclones, volcanoes, or bush-fire fronts), over complex terrains (such as close to factories or near chimney plumes), or over rough terrain (such as gullies for examining nocturnal drainage flows or katabatic winds)"(2013, p. 337). The ability to see inside a hurricane or other natural disaster is an amazing gift with potential to save lives and reduced disaster damage.

A story told in Canadian Business tells about a relief mission to a remote village in Alaska called Nome. The winter in 2011 was unusually harsh and the 3500 residents did not have enough fuel to survive the winter. A tanker was dispatched from Russia with a Coast Guard ice breaker leading the way. Even with the ice breaker the journey was treacherous, a backpack size UAV was used to scout ahead and make a 3-D map of the ice. If the UAV would not have been used the ice would have been to dangerous to navigate for the ice breaker. (Mann, 2014, p.21)

The timing of this research is critical. The Federal Aviation Administration is not finished writing regulations, therefore a positive voice could help steer regulations in a direction that will encourage innovation and not stifle it. Universities that have aerospace programs focus on this new technology. On April 30th there was a forum at the University of Minnesota hosted by the Airport Technical Assistance Program (AIRTAP). This educational conference was designed to inform a variety of groups of the impact of UAVs. Some examples given are agricultural, real estate, utility companies, and engineering firms. This event shows how crucial this information is. Many businesses and commercial entities will increase their value through the use of this technology.

The number of positive uses of UAVs are still being discovered. The aggressive innovation of this technology will continue to develop new and exciting ways for people to maximize the use of drones. A National Geographic article written in March 2013 by John Horgan describes the feelings of drone advocates stating: "They hope UAVs will soon become essential too for agriculture (checking and spraying crops, finding lost cattle), journalism (scoping out public events or celebrity backyards), weather forecasting, traffic control". These are just a few examples of what this proposal will reveal. The positive side of the unstaffed aerial vehicle must be reinforced to ensure future development of this crucial technology.

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