



UNESCO

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Research and Development of Drone Technology

Recently, the use of unmanned aerial vehicles for militaristic purposes has become a controversial topic that has been debated by many governments internationally. However, with decreasing costs of parts, sensors, and designs for UAVs, the accessibility of these devices has significantly increased. The potential of UAVs has also expanded beyond the use of well-funded militaries to technology development centers, such as universities, and even the individual [1]. The applications of UAVs merits a complex debate that involves multiple perspectives ranging from humanitarian purposes to environmental surveying to warfare. Several of these potential uses will be described and explained in this guide. Even for humanitarian applications, each use of UAVs have drawbacks or other limitations that can have severe negative consequences.

The U.N. Educational, Scientific, and Cultural Organization (UNESCO) promotes the formation of a peaceful world community that has a strong foundation based on increased education, scientific cooperation, and cultural understanding. In order to achieve this goal, technological advancements must be encouraged by national governments but also limited in certain aspects.

Drones are useful for aerial photography and environmental research, but they can also be applied to take lives. Research and development of UAVs for military purposes conflicts with UNESCO's mission. Delegates may attempt to place restrictions on military research of drones in universities and other

public institutions, while still allowing the technology research that can save lives and promote progress.

What is an Unmanned Aerial Vehicle?

The UN defines UAVs to be "... preprogrammed for a mission and [executing] without further intervention..." while a remotely piloted vehicle (RPV) "... is controlled and directed from afar during its mission..." [2][3]. However, many other sources refer to both of these as either UAVs or drones, so for practical purposes, the term RPV will be used interchangeably with UAV.

Military Use

As previously stated, many of the issues arise with military use of UAVs. The use of drones for tactical strikes and surveillance may violate international standards and human rights. Given this, many governments do not disclose the drone missions to the public, which prevents others from analyzing the success of these missions. Researchers and investigators have provided examples of these strikes causing the death of many civilians due to the lack of control of the weapon system. These deaths lead to complications in both national and international politics. The nature of UAVs results in more use, as there is no immediate danger to the pilot and they can be used with greater secrecy. [4][5].

Currently, UAVs are being produced and used by 76 countries [6]. Since 2004, drone strikes have killed over 2,200 individuals, 400

of which were civilians. Many other countries have suffered from these attacks, despite the countries issuing the drone missions reporting minimal civilian casualties. This number can actually be decreased by ensuring good communication of information to the ground control station of the UAV, thoroughly checking this information for accuracy, and correct authorization of the strike. The U.K.'s Royal Airforce has achieved a system like this, and has one reported incidence of civilian casualty. This demonstrates that the technology may not be the issue with these mistakes [7].

Humanitarian and Environmental Surveying

Expanding use of UAVs by universities, non-profit organizations, and companies illustrates a new direction and less destructive for application of these devices. One example comes from U.N. peacekeeping efforts. In the Democratic Republic of the Congo, an intervention brigade is being used to prevent human rights violations and wars between militia factions. One part of this plan is to use UAVs for surveillance of the militia at night. This ultimately would deter the armed forces and assist in the protection of civilians [8][9].

A second example comes from disaster relief and other forms of environmental surveying. Photographs taken from planes and other aerial vehicles are often useful when planning large scale projects, such as recovery from natural disasters. It is often important to the planner of the relief to determine which areas were affected and the magnitude of the problems. UAVs are an inexpensive alternative to satellite imagery and manned aerial vehicles and are small enough to be transported easily [10].

Many universities across the world conduct research with UAV technology. Fields of study that can be applied to this research include aerospace engineering, mechanical engineering, electrical engineering, computer science, environmental science, and biology. Small UAV systems can be developed and deployed that contain small experiments completed by students and faculty [1]. The use of UAVs in the educational field can greatly increase interest in STEM subjects and has the potential to allow students to conduct their own experiments without a large amount of funding.

Current Restrictions:

Many countries often restrict operation of even small UAVs. Each country has its own set of rules that determines the exact limits of flying these vehicles. For example, in the United States, UAVs can be flown at altitudes of under 400 feet, when over five miles from an airport, and within line of sight of the pilot. Government affiliated agencies can receive a certificate of authorization that allows for less restriction in terms of conditions of flying, size of aircraft, and times of operation. Other laws that do not apply directly to UAVs also affect the regulation of the systems [11].

Country Blocs:

NATO, Russian Federation, and People's Republic of China

These nations should support research of UAVs done for both military and humanitarian purposes. Many of these countries use UAVs directly in their military; therefore, progress of new drone technologies

should not stop. Also, a position of use for humanitarian purposes should not be discouraged.

African Union (A.U.)

The nations of Africa should support the encouragement of humanitarian efforts for both environmental impact and saving civilian lives. Beyond encouraging current research, these countries, should advocate for a greater push toward more widespread research and experimental testing.

The Middle East and Central Asia

Many nations in the Middle East has been a primary target for military use of UAVs. The positions these countries should take will be to limit military focus drone research as much as possible, with the ability to compromise for encouraged research in more precise strikes to prevent the death of civilians.

Asia & the Pacific Islands and South America

These nations should take a similar stance to that of the African Union, but with more focus on disaster relief. Many of these countries are susceptible to natural disasters, as seen in recent times. Future research with UAVs may allow for a quicker, more efficient disaster relief process that can save lives, infrastructure, money, and time.

Possible Actions for UNESCO:

With the intent of preventing UAV research for future military use, regulations in both public and private institutions can be implemented. Delegates may decide to encourage nations to place fines or other

deterrents on such research. Careful decisions must be made when writing a resolution to this issue, as too little regulation of military drone research will not stop the negative uses of drones, but too much regulation may result in a loss of freedom of expression, technological progress, and scientific understanding in the future.

A second option for resolution may include government incentives for non-military related research. This alternative has the benefit of increasing UAV research for humanitarian efforts and scientific progress. Ultimately, this decision may create more impact than any other military research effort. Promoting non-destructive uses of UAV systems may allow for a more widespread application that solves a greater number of topics. However, the greater the use of UAVs, the more issues there may be with privacy.

Regulation of research and education involvement with UAVs has not been a topic with many solutions in the past. UNESCO delegates should attempt to pass a resolution on this issue to create future precedents and standards that may have lasting effects.

Further Reading:

Private restrictions:

<http://www.theblaze.com/stories/2013/03/15/faa-halts-mans-drone-photography-business-over-regulations/>

University drone research:

<http://www.insidehighered.com/news/2013/02/27/more-universities-use-drones-research-privacy-concerns-remain>

University drone research:

<http://droneproject.nationalsecurityzone.org/looser-faa-restrictions-to-help-expansion-of-uav-in-universities-stephanie-yang/>

UAV flight restriction:
<http://gcn.com/articles/2013/07/15/faa-rules-domestic-uav-flights.aspx>

Military use of drones:
<http://www.theguardian.com/world/2013/oct/25/un-drones-us-policy-debate>

Innovation with UAVs:
<http://www.businessinsider.com/japanese-drone-is-most-versatile-yet-2012-6>

UAV information:
<http://www.uavs.org/aboutuavs>

Military limits of UAVs:
http://www.washingtonpost.com/world/national-security/drone-combat-missions-may-be-scaled-back-eventually-air-force-chief-says/2013/11/13/470deda4-4c97-11e3-b692-e722f1795169_story.html

More flight restrictions:
<http://www.aeryon.com/applications/regulations.html>
http://www.un.org/News/Press/docs/2013/gas_hc4078.doc.htm

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 <<http://www.theguardian.com/world/2013/oct/18/drone-strikes-us-violate-law-un>>

[8] Gberie, Lansana. "Intervention Brigade: End Game in the Congo?" UN Africa Renewal. UN, Aug. 2013. Web. 26 Nov. 2013. <<http://www.un.org/africarenewal/magazine/august-2013/intervention-brigade-end-game-congo>>

[9] "Hidat Teklom: Expanding Civilian Protection Capacity with 'flying Cameras'." UN News Center. UN, 28 May 2013. Web. 26 Nov. 2013.
 <<http://www.un.org/apps/news/story.asp?NewsID=45017>>.

[10] Kelly, Heather. "Drones: The Future of Disaster Response." Whats Next RSS. N.p., 23 May 2013. Web. 25 Nov. 2013.
 <<http://whatsnext.blogs.cnn.com/2013/05/23/drones-the-future-of-disaster-response/>>.

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 <<http://www.aeryon.com/applications/regulations.html>>.

Protecting Arctic biodiversity from climate change, long-range pollution, and invasive species

The past few decades have been filled with debate over human impact on the environment and what measures should be done to prevent further change. The world has seen the effects of climate change from increased frequency and magnitude of natural disasters to endangerment and extinction of species. New technologies have been created to counteract some of these factors, but one of the best and most effective solutions will come from an overall reduction in waste and energy consumption. In order for this to occur, people across the planet must be educated about sustainable living technologies and the impact they as an individual can have. Today, the obstacles that limit the use of these new technologies include lack of information and understanding of the situation. Education of people about the causes and effects of climate change is the first step towards a solution. This can be taught with minimal bias and can allow individuals to formulate their own opinions on what should be done about the issue of environmental change. If more people understood the long-reaching consequences of not altering the average lifestyle, they could be much more willing to support new the new technologies and their use.

Given that the goal of the U.N. Educational, Scientific, and Cultural Organization (UNESCO) is to promote education and scientific cooperation as well as sustainable practices, delegates should expect to write a resolution that encourages schools' increased involvement with green technologies and sustainable living. Having

countries increase funding for this specific reason while also changing education standards could create new classes, programs, and extracurricular activities.

Green Technology in the Classroom

Sustainable development does not always involve a new project or infrastructure at a school. Such things can be expensive and do not effectively involve most students in the school. Introducing new classes or required topics in classes can be an easy way to teach students facts about sustainability. Common science classes often cover topics that are applied in real world scenarios. Teachers can be pushed to present case studies of ecology factors in biology classes. Chemistry teachers can explain how burning of organic material does not produce one hundred percent carbon dioxide, but also produces toxic carbon monoxide. Also, they could explain how companies are able to desalinate ocean water to make it potable. There are many opportunities for including similar issues without necessarily creating a new class.

However, the ability to create a new class exists. Many schools internationally have integrated environmental science classes. Instructors can include local environmental problems as well as larger scale ones. Dedicated classes to the issue of environmental sustainability and green technologies can offer a vast range of topics and can also delve deeper into the issues in order to explore the roots of the problems and the reasons they have not been fixed yet [1].

Extracurricular Activities

Clubs and other extracurricular programs can be established outside of class time to help students get involved in actual application of these technologies. Schools can partner with local farms and electric companies to learn what new practices are being done in order to reduce waste and increase efficiency. Students often want to volunteer and they could do so if these connections were made. Other opportunities involve school clubs working with ecology, environmental protection, gardening, alternative energy sources, and energy efficiency in the school. Programs like these would allow students to be involved first hand with both the issues and the solutions rather than just having them learn about them. Involvement at this level may raise more interest, because the students are part of the whole process. It gives them importance and does not leave them on the sidelines. Sustainability labs can have students work with the making and experimentation of solar modules under different situations while analyzing the benefits and limitations of this sustainable energy source. They can then look into other systems, such as wind, hydroelectric, and countless others so they understand why all of the research and lack of substantial change is happening today [2][3].

Sustainable Schools

A significant amount of schools around the world are on large campuses that require many buildings, infrastructure, and other energy consuming requirements for maintenance. Large amounts of energy is almost wasted due to obvious inefficiencies,

such as constant 24 hours a day lighting of the building and paper used for handouts. School administration can work to reduce this energy inefficiency. Colleges are some of the first to attempt this on a substantial scale. ASU has developed a system for homework that no longer requires paper [4]. Efforts like this can not only tend to the sustainability issue, but can also get students involved by allowing them to participate in the reformation of the schools they are a part of.

Education Reform

Established in 2002, the U.N. Decade of Education for Sustainable Development (DESD) has called for many changes that attempt to solve problems such as, biodiversity, disaster risk, sustainable lifestyles, and climate change education. Though education reform itself cannot solve all problems, it is a major foundation of future change and is required for any progress to be made. Members of this program are given help for coordination of national programs to achieve the goals of DESD [5]. The subsection of climate change education entails raising awareness of climate change due to human factors. To date, several countries have been assisted by this program, partnering companies, and organizations [6].

Possible Solutions

Previous attempts at sustainable education have been to raise awareness, but newer resolutions could take this education a step further. Advocating for some of the previous topics described could expedite the process of educating the world and engender much more interest in the minds of students. True impact will need students to be a piece of the

improvement to the environment rather than observers on the sidelines.

Country Blocs

North America and the European Union (E.U.)

The nations in North America and Europe should advocate for increased programs and participation both nationally and internationally. Outreach to countries severely lacking in education and technology should a focus, so these gaps can be filled. Delegates should support these outreach programs and should attempt to write such programs into any resolutions written. Programs specifically dedicated to internal management of sustainability education are encouraged, but not the primary concern.

Africa and South America

Delegates of these nations should promote limited dedication to specifically sustainable programs. Many of these countries have problems with education outside of green technology and climate change, so minimizing requirements in resolutions should be the goal for the delegates. Resolutions that are more related to general education are acceptable, but delegates should not support resolutions with heavy constraints.

Asia

These countries should have similar goals to the North American and European bloc, but with a larger focus of internal management of these sustainability programs. Outreach programs are acceptable in resolutions, but should not be a primary concern.

Further Reading

<http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-sustainable-development/>

<http://rio20.euromed-management.com/Declaration-for-HEI.pdf>
<http://www.sustainableschoolsproject.org/>
<http://sustainabledevelopment.un.org/index.php?menu=1073>

<http://www.environment.gov.au/topics/sustainable-communities/sustainability-education/un-decade>

<http://www.unece.org/env/esd.html>

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