

<b>Forum:</b>	UN Commission on Science and Technology for Development
<b>Issue:</b>	Regulating the use of artificially intelligent unmanned aerial vehicles
<b>Student Officer:</b>	Roland Chu
<b>Position:</b>	Deputy President

---

## Introduction

Unmanned Aerial Vehicles equipped with artificial intelligence capabilities have significantly transformed numerous sectors, from agriculture and disaster response to surveillance, logistics, and transportation. The development and implementation of artificially intelligent unmanned aerial vehicles into society is no longer a dystopian future, it has become a defining reality of the present.

Artificially intelligent unmanned aerial vehicles can perform actions without direct human intervention. The transition from human-controlled aerial vehicles to autonomous aerial vehicles presents many modern implementations of the technology, while also introducing significant challenges related to safety, ethics, usage regulations, and security.

The need for a balanced and comprehensive regulatory framework that ensures the responsible and ethical deployment of these technologies is paramount. Existing regulations concerning remote-controlled aerial vehicles such as drones and model planes are no longer effective in regulating artificially intelligent unmanned aerial vehicles. Artificial intelligence blurs the lines of accountability, presenting legal and ethical issues regarding responsibility.

The global stage stands at a juncture, tasked with navigating this new era of technology to ensure safety, moral ethics, usage regulations, and security in an automated era.

## Definition of Key Terms

### **Artificially intelligent unmanned aerial vehicles (autonomous drones):**

An unmanned aerial vehicle controlled autonomously by software-controlled flight plans, that works in conjunction with on-board sensors, GPS, and off-site computers (“Unmanned Aircraft Systems / Drones”).

### **Artificial intelligence:**

The capability of a machine or program to perform tasks that usually require complex human intelligence and behaviors (IBM).

### **Commercial Drones:**

An unmanned aerial vehicle that can be remotely piloted by a human operator or controlled autonomously by software-controlled flight plans, that works in conjunction with on-board sensors and GPS and off-site computers. Purposes and uses of commercial drones include but are not limited to; photography, surveying, logistics and delivery, monitoring, and mapping (Hossain) (“Unmanned Aircraft Systems / Drones”).

### **Humanitarian Drones:**

Purposes and uses of humanitarian drones include but are not limited to; search/rescue and aiding in delivery of medical supplies (Hossain) (“Unmanned Aircraft Systems / Drones”).

## **Background**

### **Early 20<sup>th</sup> century**

Developments in the foundations for drone technology can be traced back to the 1900s. In 1907, Hermann Anschütz-Kaempfe developed the first use of a gyroscope for navigation, named the gyrocompass, which was used for measuring and maintaining an object’s orientation and angular velocity. In 1916, British engineer Archibald Low, widely regarded as the “father of radio guidance”, developed a radio-guidance system and implemented the system into an unmanned prototype biplane. In 1917 Low and his team developed the first wireless rocket (Harris) (Vyas) (Alkobi).

### **Late 20<sup>th</sup> century**

Improvements in technology and availability of necessary drone components resulted in a gradual shift from military applications to commercial applications. Remote controlled planes became prominent during the late 20<sup>th</sup> century (Vyas) (Alkobi).

### **2000 – 2010**

Further advancements in technology led to innovations on different drone configurations such as the quadcopter and helicopter. These configurations can achieve stable stationary flight in most weather conditions. The first use of drones for commercial purposes was observed the same year the Federal Aviation Administration issued the first commercial drone permit, with regulations in effect (Vyas) (Alkobi).

## 2010 – Present

The current era is widely characterized as the "Golden Age of Drones". Rapid developments in artificial intelligence, flight time, payload capacities, and autonomous navigation is facilitating significant advancements in technological capabilities and spectrum of applications, particularly in the commercial sector. Integration of autonomous drones into commercial uses have given recognition to benefits such as expedited logistics. Drones, have transcended their initial military origins and have become indispensable tools in various industries (Vyas) (Alkobi).

Recent controversies regarding ethical uses of autonomous drones such as privacy, responsibility, and safety have also materialized as these drones are being implemented into commercial and humanitarian roles (Gondek).

## Major Parties Involved

### United States

The United States and American companies have emerged as key players in the development and deployment of autonomous drones, leveraging these technologies across various sectors. Major industries, including agriculture, logistics, and humanitarian efforts, have witnessed a substantial integration of autonomous drones to enhance efficiency and capabilities. American companies such as Amazon and Zipline utilize autonomous drones for commercial logistics purposes such as delivering food for online orders (60 Minutes Staff). Zipline also uses autonomous drones to facilitate humanitarian logistics, such as in Rwanda where autonomous drones are used to deliver medical supplies to remote hospitals (Rober) (ZipLine) (Lewandowski).

### China

China's manufacturing capabilities makes the country a major exporter of autonomous drones, supplying them to numerous countries. As a result, autonomous drones are an important and significant sector of the Chinese economy. The Chinese government has also openly supported developments and the integration of autonomous drone technology, recognizing potential economic benefits. Some applicable areas for drone usage include delivery, surveillance, infrastructure inspection, and disaster response (Lewandowski).

## European Union (EU)

The European Union (EU) has been actively involved in shaping regulations for autonomous drones, emphasizing standardized guidelines, risk-based assessment, data protection/privacy, safety, and innovation.

## Previous Attempts to Solve the Issue

### 1. Part 107 FAA Drone Regulations for Commercial Drone Use

Part 107 FAA Drone Regulations outline the rules and requirements for the commercial use of drones in the United States. Issued by the Federal Aviation Administration (FAA), these regulations set forth guidelines to ensure the safe and responsible operation of autonomous aircraft for commercial purposes. Key provisions include operational limitations such as daylight-only flights and altitude restrictions, and compliance with airspace and airport restrictions. Part 107 aims to strike a balance between fostering the growth of the commercial drone industry and safeguarding public safety and aviation integrity ("The Ultimate Guide to the FAA Airman Knowledge Test").

### 2. General Data Protection Regulation

The General Data Protection Regulation (GDPR) is a comprehensive data protection and privacy framework established by the European Union. While GDPR primarily addresses personal data protection, its implications extend to various emerging technologies, including autonomous drones. Concerns related to data privacy arise in the context of autonomous drones due to their ability to collect, process, and transmit information, including potentially sensitive personal data.

GDPR mandates that any processing of personal data must be conducted lawfully, transparently, and for specific, legitimate purposes. In the case of autonomous drones, companies and operators need to ensure compliance with GDPR principles when handling data generated during drone operations (GDPR).

### 3. ICAO Model UAS Regulations Parts 101, 102, and 149

The ICAO Model UAS Regulations Parts 101, 102 and 149 are designed to provide a framework for the safe and standardized operation of unmanned aircraft on a global scale. Each part addresses specific aspects of UAS operations:

Part 101 covers the general operating rules for UAS, including registration requirements, pilot qualifications, and operational limitations. It aims to establish a foundation for the safe and responsible use of drones in various environments.

Part 102 focuses on the certification and operational approval process for more complex or higher-risk UAS operations. This could include requirements for beyond visual line of sight (BVLOS) operations or operations in specific airspace.

Part 149 regulates the certification and oversight of UAS service providers, including manufacturers, operators, and maintenance organizations. It establishes standards for ensuring the airworthiness and reliability of UAS (“ICAO Model UAS Regulations”).

## Possible Solutions

1. **Establishing International Regulations and Laws:** Establishing international regulations and laws for autonomous drones is imperative to addressing the global challenges posed by the widespread use of this technology. As drones become more prevalent across borders, standardized guidelines are essential to ensure consistency, safety, and ethical standards.

Member states should form international regulations and pass laws that emphasize the importance of mitigating risks concerning autonomous drones. This could entail frameworks for accountability and restrictions/limitations. These regulations and laws should specifically address issues of clear liability, public safety/privacy, and security.

2. **Encouraging Further Research and Development:** Encouraging further research and development in the realm of autonomous drones is crucial for unlocking the full potential of autonomous drones. As autonomy becomes more sophisticated, ongoing efforts are necessary to address technical challenges, enhance safety features, and refine the efficiency of autonomous drone systems. Fostering continued research and

development in autonomous drones is essential for addressing the issues posed while in turn facilitating the growth and refinement of the technology.

3. **Establishing Ethical AI Guidelines and Principles:** Ethical guidelines and principles for AI should be established to guide and influence further developments in AI technology and its implementations in commercial, humanitarian, and military sectors.
4. **Strengthening Review Mechanisms:** Strengthening review mechanisms for autonomous drones is crucial to ensuring the safe and responsible deployment of this technology. As autonomous drones become more prevalent, there is a need for robust oversight to address concerns related to safety, ethics, and legal compliance. This involves developing comprehensive frameworks for evaluating and approving autonomous drone systems, including thorough testing procedures and performance standards. Regular audits and assessments can help verify adherence to regulations and ethical guidelines, while also identifying areas for improvement. Collaboration between regulatory bodies, industry stakeholders, and independent experts is essential to create a well-rounded review process that considers both technological advancements and societal implications. Strengthening review mechanisms not only enhances the accountability of autonomous drone operators but also contributes to building public trust in the responsible use of this evolving technology.

## Bibliography

- 60 Minutes Staff. "Amazon Drones: Amazon Unveils Futuristic Delivery Plan - CBS News." *Cbsnews.com*, 2 Dec. 2013, [www.cbsnews.com/news/amazon-unveils-futuristic-plan-delivery-by-drone/](http://www.cbsnews.com/news/amazon-unveils-futuristic-plan-delivery-by-drone/).
- Alkobi, Jackie. "The Evolution of Drones: From Military to Hobby & Commercial." *Percepto*, 15 Jan. 2019, [percepto.co/the-evolution-of-drones-from-military-to-hobby-commercial/](http://percepto.co/the-evolution-of-drones-from-military-to-hobby-commercial/).
- Butterworth-Hayes, Philip. "Drone Delivery Operations Underway in 27 Countries." *Unmanned Airspace*, 7 Apr. 2019, [www.unmannedairspace.info/latest-news-and-information/drone-delivery-operations-underway-in-26-countries/](http://www.unmannedairspace.info/latest-news-and-information/drone-delivery-operations-underway-in-26-countries/).
- Gondek, Christopher. "The Ethical Concerns in Drone Technology." *Originstamp.com*, [originstamp.com/blog/the-ethical-concerns-in-drone-technology/#:~:text=Privacy%20is%20a%20primary%20concern.](http://originstamp.com/blog/the-ethical-concerns-in-drone-technology/#:~:text=Privacy%20is%20a%20primary%20concern.)

- Harris, Simon. "The History of Gyroscopes - from Humble Beginnings to Hyper Technology." *Advanced Navigation*, 20 May 2023, [www.advancednavigation.com/tech-articles/the-history-of-gyroscopes-from-humble-beginnings-to-hyper-technology/#gyrocompass](http://www.advancednavigation.com/tech-articles/the-history-of-gyroscopes-from-humble-beginnings-to-hyper-technology/#gyrocompass). Accessed 15 Nov. 2023.
- Hossain, Mokter. "Autonomous Drones: A Game Changer in Lightweight Delivery Services." *California Management Review Insights*, 1 Mar. 2022, [cmr.berkeley.edu/2022/03/autonomous-drones-a-game-changer-in-lightweight-delivery-services/](http://cmr.berkeley.edu/2022/03/autonomous-drones-a-game-changer-in-lightweight-delivery-services/).
- IBM. "What Is Artificial Intelligence (AI)?" *IBM*, 2023, [www.ibm.com/topics/artificial-intelligence](http://www.ibm.com/topics/artificial-intelligence).
- Lee, Dasom, et al. "Safety and Privacy Regulations for Unmanned Aerial Vehicles: A Multiple Comparative Analysis." *Technology in Society*, vol. 71, Nov. 2022, p. 102079, <https://doi.org/10.1016/j.techsoc.2022.102079>.
- Lewandowski, Jerzy. "Which Country Has the Most Advanced Drone Technology?" *TS2 SPACE*, 21 Oct. 2023, [ts2.space/en/which-country-has-the-most-advanced-drone-technology/#gsc.tab=0](https://ts2.space/en/which-country-has-the-most-advanced-drone-technology/#gsc.tab=0).
- Rejeb, Abderahman, et al. "Humanitarian Drones: A Review and Research Agenda." *Internet of Things*, vol. 16, July 2021, p. 100434, <https://doi.org/10.1016/j.iot.2021.100434>.
- Rober, Mark. "Amazing Invention- This Drone Will Change Everything." *Wwww.youtube.com*, 18 Mar. 2023, [www.youtube.com/watch?v=DOWDNBu9DkU](http://www.youtube.com/watch?v=DOWDNBu9DkU).
- "The Ultimate Guide to the FAA Airman Knowledge Test." *DARTdrones*, [www.dartdrones.com/faa-drone-regulations-commercial-drone-use/#:~:text=The%20Federal%20Aviation%20Administration%20considers](http://www.dartdrones.com/faa-drone-regulations-commercial-drone-use/#:~:text=The%20Federal%20Aviation%20Administration%20considers). Accessed 22 Nov. 2023.
- UNCTAD. *Catching Technological Waves Innovation with Equity*. 2021.
- "Unmanned Aircraft Systems / Drones." *Rmas.fad.harvard.edu*, [rmas.fad.harvard.edu/unmanned-aircraft-systems-drones](http://rmas.fad.harvard.edu/unmanned-aircraft-systems-drones).
- Vyas, Kashyap. "A Brief History of Drones: The Remote Controlled Unmanned Aerial Vehicles (UAVs)." *Interestingengineering.com*, 29 June 2020, [interestingengineering.com/innovation/a-brief-history-of-drones-the-remote-controlled-unmanned-aerial-vehicles-uavs](http://interestingengineering.com/innovation/a-brief-history-of-drones-the-remote-controlled-unmanned-aerial-vehicles-uavs).
- "What Is a Drone? - Definition from WhatIs.com." *IoT Agenda*, [www.techtarget.com/iotagenda/definition/drone#:~:text=Essentially%2C%20a%20drone%20is%20a](http://www.techtarget.com/iotagenda/definition/drone#:~:text=Essentially%2C%20a%20drone%20is%20a).
- ZipLine. "Zipline - Lifesaving Deliveries by Drone." *Flyzipline.com*, 2016, [www.flyzipline.com/](http://www.flyzipline.com/).