The Effects Of Unmanned Aerial Vehicle (Drones) On Safety In The Aviation Industry In Kenya

Abstract

Unmanned Aerial Vehicles (UAVs) have become popular for use in both military and civilian operations as it presents less risk to the persons operating them. With the increase in their usage, UAVs have started to share the airspace with in manned civil and military aircraft. The result is the endangering of the safety of people on board the manned aircraft and other persons on ground (specifically densely populated areas) around the area of the UAVs operations. Currently, there are no rules or regulations that govern the operations of UAVs in Kenyan airspace, particularly high flying UAVs. They pose potential for mid-air collisions with aircraft in controlled civil airspaces. This is why the issue of safety of civil aircraft and UAVs is crucial to the civil aviation system in Kenya. Analysis of the safety issues concerning UAVs are more complicated and serious than for normal manned civil aircraft. This is because most of the UAVs comprise of complicated systems.

Furthermore, the ground controlling systems, software and data links make safety analysis more complicated. It is also hard to identify failures due to the lack of a pilot on board who could notice such important safety concerns like changes in aircraft noise, unusual smells, vibrations etc. such failures, if not detected, may result in accidents to the UAVs themselves, people on ground and even to aircraft flying in the proximity of the UAV. It is therefore crucial that appropriate safety measures and requirements are put in place. The Kenya Civil Aviation Authority (KCAA), on 15th January 2015, issued a cease and desist order to anyone operating drones, also referred to as aerial vehicles. This came following what the KCAA termed as the proliferation of drones over the Kenyan airspace. According to this body, anyone seeking to operate these devices must first seek consent from the Ministry of Defence and authorization from the Kenyan Aviation Authority.

Definition of terms

Air Traffic Management (ATM): -An aviation term encompassing all systems that assist aircraft to depart from an aerodrome, transit airspace, and land at a destination aerodrome.

Air Traffic Control (ATC): - A service provided by ground-based controllers who direct aircraft on the ground and through controlled airspace, and can provide advisory services to aircraft in non-controlled airspace.

Altitude: -The height of an object or point in relation to mean sea level.

Drone: - An unmanned aircraft that can fly autonomously -that is, without a human in control. The aircraft may be remotely controlled or can fly autonomously through software-controlled flight plans in their embedded systems working in conjunction with Global Positioning System (GPS).

Eurocontrol: -European Organization for the Safety of Air Navigation working to achieve a seamless air traffic management across Europe.

Introduction

This chapter will address the introduction to the problem of Unmanned Aerial Vehicles (UAVs) on civil aviation safety and will address the background of the problem, statement to the problem, its research objectives and questions, significance of the study and the scope of the study.

1. 1 Background of the study

The civil aviation has been based on the idea of a pilot operating the aircraft from within the aircraft itself. When an aircraft is flown without a pilot, it will arise in several safety concerns which can be technical, operational and even ethical issues for which this proposal seeks to address and where possible offer possible solutions. Unmanned Aerial Vehicles are basically a new component to the aviation system in Kenya. The civil aviation regulator, Kenya Civil Aviation Authority (KCAA), is already in the process of formulating rules and regulations, (The Civil Aviation (Remotely Piloted Aircraft Systems (RPAS)) Regulations, 2016), that would govern their operations. The UAV systems are generally based on improved aerospace technologies that offer more advanced technologies that may improve the civil aviation safety and efficiency. The safe introduction of UAVs in civil airspaces will have to be coordinated with the stake holders who can provide advice on such issues as licensing and medical qualifications of the UAV crew, technologies on board the UAVs for detection and avoidance of other aircraft, frequencies to be used by the UAVs, the applicable separation standards to be used from other aircraft and the development of the necessary regulatory framework for their operations. This proposal would address the safety concerns raised by professionals who may be involved in the control of the UAVs and those who may be affected by their operations. It could be used to develop procedures and regulations that would govern the safe operations of UAVs in the Kenyan airspace so as not to endanger the safety of other aircraft and even persons on ground.

1. 2 Statement of the problem

Safety can be defined as a state of being “safe”, the condition of being protected from any harm or other non-desirable outcomes. It can also refer to the control of recognized hazards in order to minimize or achieve an acceptable level of risk. Safety of the aviation industry in Kenya is generally affected by several factors. The understanding of these factors is important in ensuring the smooth and secure operations in the aviation industry. It is therefore important that the management of the various players in the aviation industry ensures that coordination of various factors that enhance aviation safety are managed in order to govern all activities in the civil aviation system. Despite the numerous incidences reported on UAVs each year, little time has been spent to determine the main causes of such occurrences. This has been mainly so because the UAVs were primarily used in the military operations in the military airspaces and therefore no data was available for civilians to do investigations. However, in the recent past, several cases have been reported in the civilian airspaces more so near civil airports. A recent case was reported in a flight that was approaching to land at London Airport was hit by what is believed to be a drone.

There is no empirical literature on the effects of Unmanned Aerial Vehicles (drones) on safety of civil aviation industry in Kenya. Tony Tyler (2016), the Director-General of the International Air Transport Association, while being interviewed by the British Broadcasting Corporation (BBC) said “I am as excited as you are about the prospect of having a pizza delivered by a drone, but we cannot allow (drones) to be a hindrance or safety threat to commercial aviation”. He called for regulations to be put in place before any serious accidents occur. “The issue is real. We have plenty of pilot reports of drones where they were not expected, particularly at low altitudes around airports. There is no denying that there is a real and growing threat to the safety of civilian aircraft (coming from drones). We need a sensible approach to regulation and pragmatic method of enforcement for those who disregard rules and regulations and put others in danger”. Jane (2003) a lawyer and a senior professional with the International Civil Aviation Organization (ICAO), discusses the many factors affecting the safety of civil aviation and analyzes the regulatory processes that has been set in motion by ICAO and the regional civil aviation bodies to enhance safety.

A study by Kimani (2012) on the effect of low level flying on safety in the aviation industry in Kenya sought to determine the effect of violation of set standards on aviation safety in Kenya. In another study by King’ori (2008) on the quality of safety culture in the air transport industry in Kenya, he indicated that there is a serious lapse of management commitment to safety as well as lack of established methods of staff motivation and deficient safety programs. On the other hand, Mr. Minja (2008) sought to establish the implementation of safety management systems in the aviation industry. In determining the perception of the effectiveness of the air transport safety management in Kenya, Nyaga (2010) identified infrastructure as the greatest perceived contributor to aviation safety management at Wilson Airport. Muhumed (2010) focused on the human related factors affecting aviation safety in the local context. However, no study has been carried out to address the effects of unmanned aerial vehicles (drones) on safety in the aviation industry in Kenya. This study will therefore seek to determine the effects of unmanned aerial vehicles (drones) on safety in the aviation industry in Kenya.

1. 3 Objectives of the study

This study will be guided by both general and specific objectives.

1. 3. 1 General objective

This study will seek to establish the effects of unmanned aerial vehicles (drones) on safety in the aviation industry in Kenya.

1. 3. 2 Specific objectives

The study will be guided by the following specific objectives:

i) To identify the effects on safety from the operations of UAVs in the current airspace structure.

ii) To assess importance of the safety culture in aviation

ii) To establish the legal frameworks that should be put in place considering safety risks associated with introduction of UAVs in the Kenyan airspace.

iv) To assess the viability of allowing operations of UAVs alongside manned aircraft.

1. 3. 3 Research questions

Based on the objectives, the research will seek to answer the following questions:

i) What are the effects on safety from the operations of UAVs in the current airspace structure?

ii) What is the importance of safety culture in aviation?

iii) What legal framework should we put in place considering the safety risks associated with introduction of UAVs in Kenyan airspace?

iv) Is it viable to allow the operations of UAVs alongside manned aircraft?

1. 4 Significance of the study

The importance of this study will be derived from the interest it will generate to enrich the enrich and enhance the knowledge base of the academic community on matters pertaining to unmanned aerial vehicles and the safety of the aviation industry. It will be intended to make major contributions to the literature database on “The effects of unmanned aerial vehicles (drones) on safety in the aviation industry” in a field that has seen in the recent past rapid technological advancements. It is also intended to be a source of reference material for other researchers as well as forming a basis for further research on the topic. Generally, the findings of this study would be useful to the persons involved airspace design in enhancing their decisions on the acceptable designs for the integration of UAVs in civil airspace. It can also form a basis of reference to the regulator in formulating the necessary regulations to govern the operations of UAVs.

The findings would also serve as a feedback mechanism on the regulators, professionals and other stakeholders’ preparedness to deal with the safety problems associated with the introduction of the UAVs in the airspace. To the Kenya Civil Aviation Authority (KCAA), this study would be beneficial to: -regulator, the Air Traffic Control (ATC) staff, Aeronautical Information Services (AIS) staff and the East African School of Aviation (EASA).

For the regulator, it would help them to improve and get a better understanding of the necessary standards and the nature of the gap between the practice of flying manned and unmanned aircraft that would enable them to formulate or improve the required regulations governing the operations of unmanned aircraft in civil airspace and which would be necessary to close such gaps. For the academic fraternity, this knowledge would be useful to meet the teaching and training standards of the pilots and air traffic controllers. Pilots, through situational awareness, would be able to avoid incidences involving UAVs while the air traffic controllers, having the knowledge on UAV operations would be able to effectively maintain safety between unmanned and other aircraft operating in their vicinity or proximate areas. It will also help them cultivate a safety culture that would go a great way in helping the organization achieve its goals of achieving safety as envisaged in its objectives. This will effectively lower instances of aircraft incidences involving unmanned aircraft in the airspace.