Chapter 24
An Analysis of Unmanned Aircraft Registration Effectiveness

Ronald Pentz
Eastern Michigan University, USA

He (Herman) Tang
Eastern Michigan University, USA

ABSTRACT

This article describes how small unmanned aircraft systems (sUAS) are growing at a rapid pace. They are inexpensive and widely available for both hobbyist and commercial use. However, with this rapid growth, regulations are having a difficult time keeping pace to safely incorporate them into the United States National Airspace. Recent regulations requiring the registration of all sUAS have been overturned by the United States Courts of Appeals. This research provides a statistical analysis of the effectiveness of the registration regulation in the reduction of unauthorized and careless sUAS operation prior to being overturned by the courts. Statistical analysis including descriptive statistics and chi square hypothesis tests were used to analyze more than 3,000 reported unauthorized and careless events. The findings show a significant difference in events pre-registration and post registration.

INTRODUCTION

Small Unmanned Aircraft Systems (sUAS), otherwise known as drones are growing rapidly for both hobbyist and commercial use. Research (Lee, 2016) shows economic projections of the civil sUAS market will continue strong growth over the next several years. This is based on the current consumer spending projections which remains consistent from multiple authors and industry practitioners. Additionally, the Federal Aviation Administration (FAA) Aerospace Forecasts for fiscal years 2017-2037 estimates that the hobbyist fleet will triple in size over the next 5 years, going from 1.1 million units in 2016 to more than 3.5 million units in operation by 2021. Similarly, the commercial sUAS fleet is expected to grow from 42,000 in 2016 to 420,000 by 2021. When both the hobbyist and commercial fleets are combined,

the number of unmanned aircraft operating in the National Airspace (NAS) reaches an estimated 4 million by 2021. With that estimated exponential increase in air traffic, it raises obvious concerns about the safe and effective integration of these drones into the NAS.

Unlike manned aircraft, part of the sUAS growth comes from simplicity to manufacture, wide availability both online and in-store, and inexpensive to purchase. There are approximately 89 unmanned aircraft manufacturing companies in the United States building these unmanned aircraft (Canis, 2015). The number of manufacturers worldwide is much larger. The product range offered is anything from a small unit that costs less than $200 and can fly on a single charge for around 10 minutes to a commercial grade unit costing upwards of $10,000 that can fly for a much longer period of time (Canis, 2015).

This rapid sUAS growth leads to concerns such as safety, reliability, and privacy. In turn, this has made it a challenge for the FAA to integrate the expanding sUAS population into the NAS (Branum, 2016). A fine balance must be achieved to avoid over regulation in the United States which could unnecessarily slow drone growth while under regulating could potentially induce unnecessarily high levels of risk into the NAS.

Statement of the Problem

In an attempt to safely integrate the expanding sUAS population into the NAS, the FAA has released recent regulations. Specific to this research was a regulation released on December 16, 2015 that requires all sUAS owners to register their unmanned aircraft prior to operation (Registration and Marking Requirements for Small Unmanned Aircraft, 2015). The intent of the registration requirement was to combat unsafe sUAS operations in the NAS. For example, in the case of careless or unauthorized sUAS operation, the registration markings on the side of the unmanned aircraft is one way to directly link it back to the owner allowing education and/or penalties to deter future occurrences of unsafe flight.

However, on May 19, 2017 the United States Court of Appeals overturned the registration requirement for hobbyists to register their sUAS by citing the FAA Modernization and Reform Act exclusion of model aircraft (On Petitions for Review of Orders of the Federal Aviation Administration). With the overturning of the registration requirements for hobbyists the sUAS owner is no longer required to register their drone which then becomes hard to identify.

The U.S. Court of Appeals may have made the correct decision based on the rule of law, but statistical analysis is needed to show if there is a need to change the laws that led to their decision. The problem remaining to solve is that there has been no statistical analysis regarding the effectiveness of sUAS registration requirements in reducing unauthorized and careless operation in the NAS. Once that problem is solved, decisions regarding the need to change laws could be made with the support of quantitative evidence.

Purpose of the Research

While recognizing and respecting the United States Court of Appeals decision to overturn the registration requirement based on their legal interpretation, this research will provide a statistical analysis of the effectiveness of sUAS registration in reducing careless and unauthorized operation within the boundaries of the United States of America. The proposed research will statistically analyze the effectiveness of sUAS registration in the reduction of unauthorized and careless drone operation.

13 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/an-analysis-of-unmanned-aircraft-registration-effectiveness/226852

Related Content

Aviation Cybersecurity: Shielding Against Cyberthreats in the Air
Caner Asbaand ule Erdem Tuzlukaya (2024). *Harnessing Digital Innovation for Air Transportation (pp. 47-61).*
www.irma-international.org/chapter/aviation-cybersecurity/340954

Advanced Techniques for Range Detection
 (2018). *Recent Advancements in Airborne Radar Signal Processing: Emerging Research and Opportunities (pp. 85-132).*
www.irma-international.org/chapter/advanced-techniques-for-range-detection/207523

Mission Performance Aid for Aerial Combat
Kevin M. Smith (2016). *International Journal of Aviation Systems, Operations and Training (pp. 1-19).*
www.irma-international.org/article/mission-performance-aid-for-aerial-combat/176721

Academic Foundations of Air Transportation Research in an Emerging Country: A Bibliometric Analysis
Huseyin Onder Aldemirand Ferhan Kuyucak Sengur (2017). *International Journal of Aviation Systems, Operations and Training (pp. 15-27).*
www.irma-international.org/article/academic-foundations-of-air-transportation-research-in-an-emerging-country/203057

A Simulation Approach to Enhancing Aircraft Availability
Massoud Bazargan, Ken Byrnes, Ali Mazhar, Adedoyin Adewumiand Qing Liu (2014). *International Journal of Aviation Systems, Operations and Training (pp. 44-50).*
www.irma-international.org/article/a-simulation-approach-to-enhancing-aircraft-availability/111990