Chapter 67
The Future for Civilian UAV Operations

Tarryn Kille
University of Southern Queensland, Australia

Paul R. Bates
University of Southern Queensland, Australia

Seung Young Lee
University of Southern Queensland, Australia

David Murray Kille
University of Southern Queensland, Australia

ABSTRACT

The future looks bright for unmanned aerial vehicles (UAVs). Their ability to carry sophisticated imaging equipment attached to lightweight vehicles, to hover in position despite incremental weather conditions, to fly simple missions, and takeoff and land automatically, combined with their comparatively (compared to manned aircraft) lower investment and operational costs has driven a paradigm shift in the history of air transport. This chapter is organized around six themes that underscore the current discourse regarding the future of UAVs in civilian commercial operations, as well as highlighting the discussions of the previous chapters regarding policy and certification, technology, training, social and economic forces, air cargo, and the effect of UAVs on other sectors of the air transport industry.

INTRODUCTION

The future looks bright for Unmanned Aerial Vehicles (UAVs) (Albaker, 2013; Peterson, 2006). Their ability to carry sophisticated imaging equipment attached to light weight vehicles, to hover in position despite incremental weather conditions, to fly simple missions, and takeoff and land automatically, combined with their comparatively (compared to manned aircraft) lower investment and operational costs, has driven a paradigm shift in the history of air transport (Perritt & Sprague, 2017).

DOI: 10.4018/978-1-7998-5357-2.ch067

Their current applications will see them provide aviation support to markets and economies where current manned aircraft are unable to operate (Wargo, Church, Glaneueski, & Strout, 2014). Their novelty is already causing heated debate from a political, public and regulatory perspective (Hail & Coyne, 2014). The discourse is often divided between those that are optimistic about the potential applications and solutions to problems that UAVs can offer, and those that oppose based on the fear of perceived risks to safety, security and privacy that UAVs pose (Elias, 2012).

This chapter is organized around six themes that underlie the current discourse about the future of UAVs in civilian commercial operations, as well as the discussions of the previous chapters regarding: policy and certification; technology; training; social and economic forces; air cargo; and the effect of UAVs on other sectors of the air transport industry.

POLICY AND CERTIFICATION

It is apparent from the preceding chapters that Unmanned Aerial Vehicle (UAV) operations in the civilian environment are on a forward trajectory, increasing in numbers and applications with more complex and demanding missions. Currently, system developments in this field are driven by the preferences and inclinations of manufacturers and users. Such development tends to lead, inevitably, to a vast array of control station configurations, internal vehicle software and a perplexing mix of pilot-vehicle interfaces. Predictably, well considered Human Systems Integration (HSI) supported by holistic systems engineering approach is illusive and rarely applied (Bennet, Bridewell, Rowe, & Craig, 2016; Gawron, 1998). Hence, operator and vehicle certification has become a significant cause for concern (Du & Heldeweg, 2018)

The variations in the dimensions and sizes of UAVs range from very small (under 25 kilograms) to very large (over one tonne) (Perritt & Sprague, 2017) provide an additional complication to the situation. Moreover, UAVs are being used to respond to an extensive variety of existing and rapidly emerging needs in commercial and consumer applications. These emerging needs in the commercial and consumer sector include examples such as agricultural surveying and crop inspection, motorway surveillance, bridge inspection, vaccine delivery and package delivery (De la Torre, Ramallo, & Cervantes, 2016).

The global political and regulatory environment encompassing UAV operations will continue to be problematic (Kreps, 2014). The Federal Aviation Administration (FAA) released a Notice of Proposed Rule Making (NPRM) in February 2015, which commits to the development and establishment of rules governing the operation of small remotely piloted aircraft (under 25 kilograms) (Jiang, Geller, Ni, & Collura, 2016). However the NPRM raised a number of questions and does not address the rapid emergence of the UAVs weighing more than 25 kilograms. Since then, Part 107 has been published. “Part 107” refers to Part 107 of Chapter 14 of the Code of Federal Regulations published by the FAA (Olsen, 2017). This rule provides a regulatory framework that every drone pilot must follow in order to commercially fly an unmanned aerial vehicle (UAV), or drone. This rule includes operational limitations, pilot responsibilities, and aircraft requirements.

To be effective, rules need to be realistically enforceable with the appropriate budget and staff provided to the enforcing authority. Part 107 also introduced a new category of pilot license for the UAV operator. The world of aviation and aerospace is facing a paradigm shift in air transportation (Lacher & Maroney, 2012). This shift is grounded in autonomous flight and UAV technology. In previous chapters we have established that today, UAVs are used for such tasks as inspecting tracks or power lines and assessing bushfires. However, the UAVs of the future will be larger models, capable of transforming