DRONE ALLIANCE EUROPE

Performance-Based Drone Regulation

Summary

The aviation industry is rightly proud of its exemplary safety record. However, increasing demand and operational complexity require a more focused, flexible and mature approach to safety oversight. The industry needs a flexible regulatory framework; one that maximises value to stakeholders by allocating human, technological and logistical resources to those areas where they are can be most effective.

The strength of this approach lies in acknowledging that different users have different operational needs and constraints. UAV operators may require a different type of service than manned aircraft operators. A flexible framework uses a more measured approach to proactively determine where risks are poised to be maximal, and allocates resources to mitigate the effects of those risks.

The benefits of the UAV industry to economic growth are indisputable. Worldwide revenues in the UAV market are expected to reach €10.3 billion per year by 2020. Adopting legislation with inappropriate safety safeguards risks losing out on such growth. Instead, we need a data-driven, measured approach to regulatory reform; one that maximises value for all airspace users, manned and unmanned.

Introduction

The figures associated with aviation's economic contribution to the world are remarkable. Within the European Union, the aviation sector supports some 5 million jobs and contributes over €300 billion to the continent's gross domestic product. Since its inception, aviation has been increasingly recognised as a fundamental pillar of global society, as indispensable to our daily lives as medicine and telecommunications, and essential for social progress and economic prosperity.

New Entrants

The industry is poised for further growth with the introduction of UAVs. Although UAVs have existed in one form or another since the mid-19th century, interest in the concept has grown in recent years as technology has increased in quality and declined in price (Autor & Price, 2013), making UAV operation logistically and economically feasible. The House of Lords' Sub-Committee on EU Internal Market projects that nearly 150,000 potential jobs could be created by the UAV industry and it's associated applications across Europe by the year 2050 (House of Lords, 2015).

There is now a need for a regulatory framework that accommodates UAV operations.

Aviation is first and foremost about safety. The industry spends billions every year investing in technologies that reduce the likelihood of accidents. It is therefore from the perspective of safety that new airspace entrants, manned or not, are evaluated when their operation is considered by regulatory authorities.

On this point, UAVs seemingly do not fare well. The flying public has been inundated with media reports of UAVs getting too close for comfort to airliners. According to the

US Federal Aviation Administration, reports of close encounters between UAVs and commercial airliners have surged since 2014. These reports have prompted the International Air Transport Association to label UAVs “a real and growing threat" to civilian aircraft. Pilot associations have voiced similar sentiments.

Legislative Safety ‘Solutions’

Clearly, there is a need for a regulatory framework that accommodates UAVs into commercial airspace without compromising safety. To date, this been approached through the rigid application of safety legislation. Some parts of this legislation make sense: the FAA requires that all UAVs above 250 grams be registered; UAVs cannot be flown within a certain distance of an airport without prior approval.

Other aspects of safety legislation are more problematic. UAV operations in South Africa require a license and a ‘letter of approval’. The FAA requires that operators of UAVs flown for commercial purposes possess a ‘Remote Pilot Airman Certificate.” The Airline Pilots Association is calling for UAVs to be equipped with the same type of collision avoidance technology required of manned commercial and general aviation aircraft (Air Lines Pilot Association, 2015). Moreover, ALPA always wants UAV operators to hold commercial pilot certificates if they operate their UAVs for “for compensation or hire” in airspace shared with commercial aircraft.

Such requirements may seem justified when it comes to ensuring safety. But they neglect two critical factors. First, the industry-wide notion of safety has changed over the past few decades. Secondly, the users of the airspace system have also changed. Both changes have implications for the health of the UAV industry.

The Evolution of Safety: According to the International Civil Aviation Organization, safety refers to a situation where, “the possibility of harm to persons or of property damage is reduced to, and maintained at or below, an acceptable level through a continuing process of hazard identification and safety risk management. (International Civil Aviation Organization, 2013)” For most users of the aviation system, safety means arriving at their destination in one piece.

Technology has helped do just that. This explains why according to IATA statistics, the global jet accident rate (measured as the number of aircraft lost per 1 million flights) is amongst the lowest in recorded history; this despite the scheduled air transportation industry being nearly 100 times larger than it was some seven decades ago. Confronted with record low number of fatal aviation accidents, IATA notes that, “future safety gains will come increasingly from analysing data from the more than 38 million flights that operate safely every year, rather than just the handful of flights where something goes wrong.”

Simply put, in the era of technology, the relentless focus on ‘conventional’ safety metrics alone, such as collisions and near misses, does not adequately capture airspace risk. This calls into question the effectiveness of those safety initiatives directed towards UAV integration and operation.

Change in Airspace Users: Historically, large commercial air transport operators have been the largest users of national and international airspace. The world’s oldest airline, KLM, launched operations with a De Havilland DH-16 in 1919. Aircraft designed and built for the sole purpose of catering to the business aviation community did not emerge until the late 1950s and early 1960s (Bernstein & Lawrence, 2011). The same is true of the agricultural aviation sector. ‘Crop dusters’ were the remnants of surplus wartime aircraft.

Today, new aircraft continue to be built for purposes other than the commercial transportation of passengers. These include express cargo delivery, disaster management and marketing. The actions of such a wide variety of users are complex; motivated by various and often opposing needs that are not always clearly defined nor understood in terms of their mutual influences and consequences. This includes profits, safety, security, timeliness and environmental concerns (Morser, 2009).

The environment in which these users operate is constantly expanding and the management structures that constrain their operations are constantly changing. Yet the regulations aimed at providing safety assurance to these users often remain unchanged. This is particularly problematic for the UAV industry because rigid legislation provides a safety cushion that may well be inappropriate for what UAVs require.

Justification for Existing Safety Regulation

Compounding the problem is the fact that justification for such legislation in manned aviation operations is also questionable. For example, horizontal separation of commercial aircraft flying below 10,000 feet near an airport is limited to 3 miles. That figure rises to 5 miles above 10,000 feet. However, a review of available evidence suggests that these separation requirements are in fact arbitrary. The choice of 5-mile separation minimum influenced by the fact that radar target arcs of more distant targets appear wider on the radar screen, and thus why a larger separation minimum was deemed necessary for targets further from the radar site. Put another way, there is no empirical basis for what is arguably the most rigid regulation aimed at keeping commercial airliners safely separated. Given this fact, the application of such rules to UAV operations is questionable.

The same may be said of requirements that UAV operators to hold commercial pilot certificates if they operate their UAVs for commercial purposes in commercial airspace. A key component of holding a commercial flight certificate is an increased flight hour requirement in comparison to a basic private pilot's license. Yet, there is little evidence to suggest that an increase in the number of flight hours yields a measurable safety improvement when it comes to flying an aircraft. In fact, one recent study found the number of flying hours to be a poor predictor of safety (Bjerke et al, 2016). This has not stopped legislators from mandating hour requirements for manned operations.

These rules are justified on the grounds of safety, the reasoning being that a pilot with more experience can fly an airplane safer than one with less. Yet, studies supporting such a statement are lacking. The only measurable impact of the legislation has been to worsen the existing regional pilot shortage (The Economist, 2016).

Moving Forward

In fact, properly addressing such issues from a regulatory perspective requires both an analysis of the needs of manned and unmanned operators and the development of a flexible regulatory framework that caters to those needs to the maximum extent possible.

Needs Analysis: Aviation's economic success requires an environment where the various users' business models can be supported. To accomplish this, definitions of service performance, continuous measurement and knowledge of real-time user

expectations of service delivery are required (Morser, 2009) for both manned and unmanned operators.

Moreover, the risks associated with the provision of services must also be identified. Such risks may be of a human, environmental or engineering nature. It is reasonable to expect that user expectations will vary both by the various types of users – commercial versus private; manned versus unmanned – and between the business model employed and service provided – low fare versus legacy; agricultural versus business transport.

Flexible Regulatory Framework Development: Having identified the needs of manned and unmanned operators, the next step entails developing a flexible regulatory framework; one that maximises value to stakeholders by allocating human, technological and logistical resources to those areas where they are poised to be most effective.

The strength of this approach lies in acknowledging that different users have different operational needs and constraints. UAV operators may require a different type of service than manned aircraft operators. Even amongst UAV operators, service expectations vary. Simply put, a 'one-size fits all' approach is unlikely to prove successful. A flexible framework uses a more measured approach to proactively determine where risks are poised to be maximal, and allocates resources to mitigate the effects of those risks.

Conclusion

Viewing UAV integration and operation as a safety impediment ignores a seldom-discussed truth: the safest system is the one in which no users fly at all. That is clearly unacceptable. It is incumbent on us to find a way that focuses on the real risks and is flexible enough to allow all of the airspace users to operate together.

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