

Chapter 10

Using Long Endurance Remotely Piloted Aircraft Systems to Support Humanitarian Logistic Operations: A Case Study of Cyclone Winston

Peter Tatham

Griffith University, Australia

Yong Wu

Griffith University, Australia

Catherine M. Ball

Remote Research Ranges, Australia

Pete Diplas

HK Logistics, Australia

ABSTRACT

Whilst there has been some limited use of Remotely Piloted Aircraft Systems (RPAS) as part of the response to natural disasters, to date these have typically employed short range mini or micro systems. Using a case study of Cyclone Winston that struck Fiji in February 2016, this chapter demonstrates the potential for long endurance aircraft (LE-RPAS) to support the humanitarian logistic operations through the use of their high quality optics and communications capabilities. In doing so, it offers a high level route map for the development of the people, process and technology requirements that will be needed to underpin the future deployments of LE-RPAS in providing support to humanitarian activities.

INTRODUCTION

It has recently been estimated by the United States Federal Aviation Administration (FAA) that sales of Remotely Piloted Aircraft Systems (RPAS) will grow from their estimated 2016 annual US sales level of 2.5 million an annual level of 7 million in 2020 (FAA, 2016). It is unsurprising, therefore, that their use in support of the response to disasters is already taking place and is likely to expand. This is underlined by a recent report discussing the use of RPAS in a humanitarian context in which the United Nations Office for the Coordination of Humanitarian Affairs commented that: “[the] move from speculation to

DOI: 10.4018/978-1-5225-2575-2.ch010

reality raises challenging questions around ... how best to integrate [RPAS] into humanitarian response.” (OCHA, 2014, p. 3).

However, to date, the use of such RPAS has mainly been limited to short range mini or micro variants such as those documented in a number of recently published case studies (UAViators, 2016). The aim of this chapter is, therefore, to consider the potential benefits and costs of the operation of long endurance RPAS (LE-RPAS) in support of the logistic response to natural disasters. In doing so, the events surrounding Cyclone Winston that struck Fiji in February 2016 will be used as an exemplar to demonstrate both how an LE-RPAS might be employed as well as the steps that would be needed to operationalise this concept in a robust way.

In discussing this subject it is important to note that there are multiple words and/or acronyms that have been used to describe RPAS which include Unmanned Aerial Vehicles (UAVs), Unmanned Aerial Systems (UAS) and Drones. Within this chapter, however, the term Remotely Piloted Aircraft Systems (RPAS) will be used as this reflects the nomenclature adopted by the International Civil Aviation Organisation (ICAO). In addition, the use of ‘RPAS’ to describe such systems helps avoid the potential negative connotations of the military use of UAVs/UAS/Drones which is clearly unhelpful when considering their operation in a humanitarian context. Furthermore, when referring to the aircraft (as distinct from the overall system), the acronym RPA (or RPAs) will be used.

To achieve the chapter’s aim, it will first offer a brief overview of the generic humanitarian logistic (HL) challenge. It will then offer a summary of the literature relating to RPAS in an HL context before discussing the capabilities of a typical LE-RPAS. An overview of Cyclone Winston follows, after which the chapter will outline the ways in which an LE-RPAS could have been used to mitigate the cyclone’s impact. The chapter will end with a discussion of the next steps that will be needed to underpin a broader use of LE-RPAS to support the HL response to a disaster.

THE HUMANITARIAN LOGISTIC CHALLENGE

In the same way as the commercial logistician, the challenge facing his or her humanitarian counterpart is that of matching supply with demand in an efficient and effective way. Thus, in the ‘for profit’ environment the demand side of the equation becomes clear from the action of a consumer purchasing a product in a shop or via the internet. However in the aftermath of a disaster those who have survived are focussed on staying alive and minimizing the impact of the event. As a result, the process of ascertaining their requirements – usually termed ‘needs assessment’ – frequently has to be undertaken by a 3rd party such as staff from a government agency or from a non-government organisation (NGO).

Furthermore, this process is often challenged by the failure of communications systems as well as the affected population’s demographics and, hence, individuals’ particular needs (Kovács & Tatham, 2010). Thus determining the answer to the ‘4W question’ (Who Wants What Where) can be extremely complex, particularly recognising that the price of failure is not simply a matter of reduced profits. On the other side of the equation, the physical impact of the disaster frequently disrupts re-supply routes – for example through disrupted sea ports and airports, blocked roads, destroyed bridges etc, all of which reduce the speed and effectiveness of the response.

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/using-long-endurance-remotely-piloted-aircraft-systems-to-support-humanitarian-logistic-operations/183486

Related Content

Discovering Requirements for the Technology Design to Support Disaster Resilience Analytics

Kathleen Moore and Hemant Purohit (2019). *International Journal of Information Systems for Crisis Response and Management* (pp. 20-37).

www.irma-international.org/article/discovering-requirements-for-the-technology-design-to-support-disaster-resilience-analytics/235428

How Individuals Hypothetically and Realistically Respond to Media Messages About Severe Weather

Cory L. Armstrong and Nathan A. Towery (2021). *International Journal of Disaster Response and Emergency Management* (pp. 47-62).

www.irma-international.org/article/how-individuals-hypothetically-and-realistically-respond-to-media-messages-about-severe-weather/273003

Volunteered Geographic Information for Disaster Management

Doris Dransch, Kathrin Poser, Joachim Fohringer and Christian Lucas (2014). *Crisis Management: Concepts, Methodologies, Tools, and Applications* (pp. 477-496).

www.irma-international.org/chapter/volunteered-geographic-information-for-disaster-management/90731

Communication During Bushfires, Towards a Serious Game for a Serious Matter:

Communication During Bushfires

Carole Adam, Charles Bailly and Julie Dugdale (2018). *International Journal of Information Systems for Crisis Response and Management* (pp. 79-105).

www.irma-international.org/article/communication-during-bushfires-towards-a-serious-game-for-a-serious-matter/222740

Incremental Distributed Learning With JavaScript Agents for Earthquake and Disaster Monitoring

Stefan Bosse (2019). *Emergency and Disaster Management: Concepts, Methodologies, Tools, and Applications* (pp. 813-833).

www.irma-international.org/chapter/incremental-distributed-learning-with-javascript-agents-for-earthquake-and-disaster-monitoring/207603