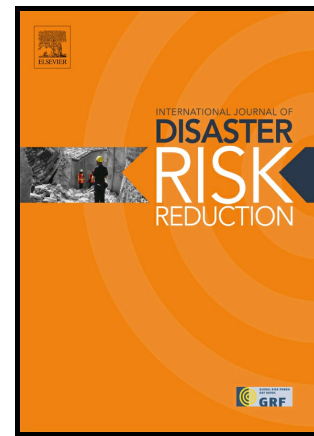


Author's Accepted Manuscript

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Case Study on the Australian State of Victoria

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www.elsevier.com/locate/ijdr

PII: S2212-4209(16)30202-3
DOI: <http://dx.doi.org/10.1016/j.ijdr.2016.10.008>
Reference: IJDRR431

To appear in: *International Journal of Disaster Risk Reduction*

Received date: 6 May 2016
Revised date: 19 October 2016
Accepted date: 19 October 2016

Cite this article as: Farzad Alamdar, Mohsen Kalantari and Abbas Rajabifard
Understanding the Provision of Multi-agency Sensor Information in Disaster
Management: A Case Study on the Australian State of Victoria, *International
Journal of Disaster Risk Reduction*, <http://dx.doi.org/10.1016/j.ijdr.2016.10.008>

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Understanding the Provision of Multi-agency Sensor Information in Disaster Management: A Case Study on the Australian State of Victoria

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Abstract

Excitement about the potential usage of sensor data sourcing to provide near real-time information has spread to the emergency management sector. Despite the advantages that shared sensor-derived situational awareness may provide, research has been limited on the actual utilization of multi-vendor sensor data in disaster management. In consideration of this shortcoming, an empirical case study is conducted in the Australian state of Victoria to understand the current practices and requirements for access, exchange, and usage of multi-agency sensor data amongst participants in flood disaster organizations. First-hand knowledge of sensor data producers and disaster decision-makers is used, disclosing serious technical barriers to interoperable access to the highly disparate organizational sensor data. The findings also uncover the mechanisms in use for integrating multi-agency sensory information in disaster management, revealing the capabilities required of stakeholders to derive disaster information from raw sensor feeds.

Keywords: Multi-agency, Flood disaster management, Sensor information integration, Internet of Things (IoT), In situ sensing, OGC Sensor Web Enablement, Sensor network

1. Introduction

Facing with disasters of various types and intensity has become a complex environmental management issue (Srinivas and Nakagawa, 2008). The short response time that obtains for rapid onset disasters (such as floods, storms and bushfires) necessitates fast and coordinated actions of several actors (Padhy et al., 2015). Numerous agencies that might or might not be established organizations for disaster management are required to contribute and share resources and information during emergency situations (Allen et al., 2014; Nivolianitou and Synodinou, 2011). Dealing with challenges associated with the exchange of disaster information in a multi-agency environment is still a main research theme (Seppänen and Virrantaus, 2015; Noran, 2014; Salmon et al., 2011; Lee et al., 2011; Hristidis et al., 2010), especially those challenges that are related to the interoperability of emergency information (Zdravković et al., 2015; Allen et al., 2014).

Amongst the various types of disaster information that need to be shared with relevant actors, spatial information plays a pivotal role (Gupta and Mishra, 2015; Koswatte et al., 2015; Mansourian, 2005). In recent years, a new spatial data sourcing technology called in situ sensing (Diaz et al., 2013) has emerged and gained attention in the emergency management sector as a potential solution for providing live disaster information (Alamdar et al., 2015). Currently, an increasing number of sensors are deployed and used by organizations involved in disaster management. However, there is a lack of understanding about how these sensor resources are used in practice within disaster situations. Therefore, there is a need for systematic assessment of the factors affecting sensor utilization in cooperative disaster management.

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