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THE PARADIGM SHIFT FROM SATELLITE TO ALTERNATIVE METHODS OF EARTH OBSERVATION DURING EMERGENCY DISASTER MANAGEMENT

Abstract

The stage for digital mapping and Earth Observation (EO), which has been predominantly served by satellite imagery, is seeing a paradigm shift in its composition. Traditional initiatives for interactive mapping coordinated by national governments take a top-down approach, which carries advantages such as having access to government data and engagement of local stakeholders. However, this approach can be seen to break down in certain circumstances, such as in conflict and emergencies where disaster management is required and current data is crucial. A bottoms-up approach has been used in recent cases, where initiatives are developed independent of the local government and EO alternatives are used, namely the use of Unmanned Aerial Vehicles (UAV's) and map crowd-sourcing.

This paper aims to investigate the use of alternative methods of EO where satellite imagery proves to be insufficient or unavailable. Both UAVs and crowd-sourcing methods will be analyzed quantitatively in terms of accessibility to those affected in an emergency, financial cost to implement, the implementation readiness of the method and the collaborative nature of the method, with satellite imagery serving as a baseline technology. Challenges and risks of each method will also be outlined with respect to emergency disaster management. A case study of one such disaster in which an alternative EO method was used will be outlined- the Haiti earthquake in 2010. This method's ability to easily facilitate international cooperation will be discussed in detail, and the results of this paper aims to draw conclusions on the role and implementation of two new technologies, UAS and crowd-sourcing, for Earth Observation purposes.