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AREA: A Mobile Application for Rapid Epidemiology Assessment

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Abstract

Health crises are challenging because the normal channels of communication and ways of reporting have often broken down under novel and unexpected circumstances. The most critical need in such situations is accurate, timely, and relevant information. AREA is a mobile application designed specifically for bio surveillance and health crisis resiliency. The app helps health workers identify and obtain the most critical information to assess and mitigate health risks; distribute these data in a secure and curated way, and optimize cross-organizational resource allocation. AREA provides situation awareness, comprehension, and projection of relevant on-the-ground information. In short, AREA meets the most pressing need in health crisis management. The Area app combines state-of-the-art social networking technology with advanced, proven algorithms for assessing risk and managing distributed resources. Intuitive user experience design ensures that the Area app is easy to understand and to use, even for non-technical personnel. The Area app is designed for application in all phases of public health or humanitarian crisis management, from Early Detection/Onset to Response/Relief and Recovery/Transition.

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1. Introduction

Disasters, public health emergencies and humanitarian crises are generally characterized by a high-level of uncertainty. Uncertainty is not only a problem during the onset and immediate aftermath of a crisis, but often lingers well into the recovery phase, making it difficult to formulate courses of actions and track efficacy of response efforts. Informational uncertainty often stems from delays in information flows, frequent contradictions in information, and the untrustworthy of information sources coupled with fast paced change in the facts on the ground. All too often this uncertainty hinders the effectiveness of relief efforts by negatively affecting decision

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making, which can result in critical resources not being allocated where most needed.

Increasingly, ubiquitous mobile computing platforms, including smart phones and tablets, can serve two important purposes in managing uncertainty and developing effective and timely actions in response to public health emergencies and humanitarian crises. First, smart phones and tablets can provide personal situation awareness tools, to which one can quickly refer in order to obtain information that supports decision making. Second, mobile computing platforms are rich with sensors, including GPS and cameras, and so can form a distributed sensor network not only for passive collection of information but also for active collection through targeted requests from users via social media, text messaging and email. The key to fully leveraging the benefits that mobile devices offer in addressing the uncertainty challenges is an "app" specifically designed to support group coordination and information sharing from the various entities involved in responding to a disaster or humanitarian crisis, which may include NGOs, first response organizations, military units as well as the general population (see Figure 1). Such an app is described in this paper.

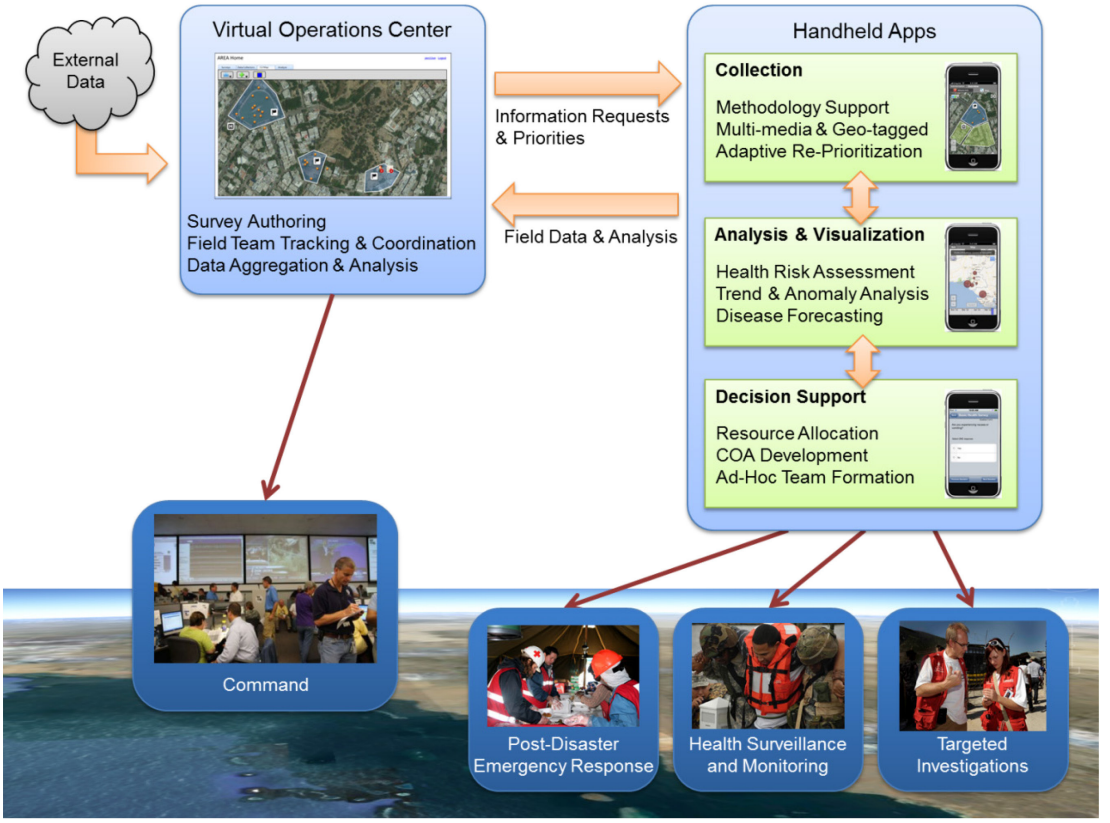

Figure 1. Area Solution Footprint.

2. The AREA Solution

The AREA mobile app that Perceptronics Solutions is developing for Apple iPhone/iPad and Android mobile devices provides novel capabilities and visualization tools for maintaining situational awareness, collecting vital information to support decision making and formulating rapid courses of action. In addition, AREA integrates with Perceptronics Solutions' OssaLab Social Media Analysis platform to support multimodal biosurveillance and fusion of information from social media with data reported from the app. Figure 2 illustrates the AREA solution footprint. AREA is designed to support use and deliver value even when there is only intermittent or limited network