NOVEL EMERGENCY/PUBLIC HEALTH SITUATION ROOMS AND MORE USING 4-D GIS

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ABSTRACT:

This paper introduces a new vision of emergency and public health situation rooms that leverage and harness the powers of the social Web ("Web 2.0"), the 3-D Web, and Internet GIS.

1. INTRODUCTION

Current flat (two-dimensional - 2-D) Web collaboration tools such as Google Wave (http://wave.google.com/) and Microsoft Vine (http://www.vine.net/ - *cf.* Depiction: http://www.depiction.com/) can be used in Virtual Public Health Emergency Situation Room applications, but leave much to be desired.

2. A NEW VISION

4-D GIS (four-dimensional Geographic Information Systems comprising three-dimensional GIS - 3-D, plus the temporal/real-time dimension) serve very well the classic public health Person-Place-Time Triad. We are proposing to develop a 4-D GIS collaborative and interactive platform that marries virtual globes or 3-D mirror worlds (such as Google Earth™: http://earth.google.com/ and Bing Maps 3D: http://tinyurl.com/38oc5v) and 3-D virtual worlds (such as Second Life®: http://secondlife.com/ and OpenSim: http://opensimulator.org/), and complements and tightly integrates them with other key technologies, e.g., real-time, geo-tagged RSS-Really Simple Syndication feeds (including data feeds from physical/environmental sensors) and geo-mashups (using Web services such as Yahoo! Pipes: http://pipes.yahoo.com/).
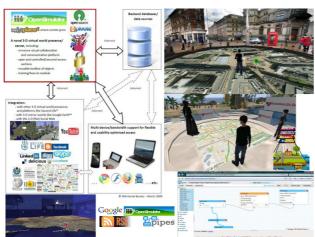

Figure 1. Towards novel Emergency/Public Health Situation Rooms using 4-D GIS

Such a platform would be much suited for emergency and disaster management in real-time, e.g., for managing an influenza pandemic and coordinating actions at global, regional and local levels. The platform can weave data and services in real-time from different sources into a new rich 'datascape' that better reflects the current situation in novel ways that are easier to understand and manage. The envisaged platform can also enable more effective spatiotemporal infodemiology and infosurveillance public health activities, tapping into emerging initiatives in the areas of technosocial predictive analytics and serious gaming technologies (see: http://predictiveanalytics.pnl.gov/ and Google Flu Trends, a current infodemiology/infosurveillance service example: http://www.google.org/flutrends/). The platform has to be secure, enabling multiple distributed persons to "see" each other, visualise relevant data together in unique ways, conduct 3-D simulation scenarios, and collaborate in real-time, each according to their assigned role and access privileges. Exploratory research (Kamel Boulos and Burden, 2007; Kamel Boulos and Burden, 2008; Kamel Boulos *et al.*, 2008a; Kamel Boulos *et al.*, 2008b; Huang, Kamel Boulos and Dellavalle, 2008; Toro-Troconis and Kamel Boulos, 2009) is currently being undertaken by the author and some collaborators towards the realisation of this vision (Figure 1).

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