Novel Emergency/Public Health Situation Rooms (*and more*) Using 4-D GIS

Maged N Kamel Boulos, PhD, SMIEEE

University of Plymouth, Devon, UK

mnkboulos@ieee.org

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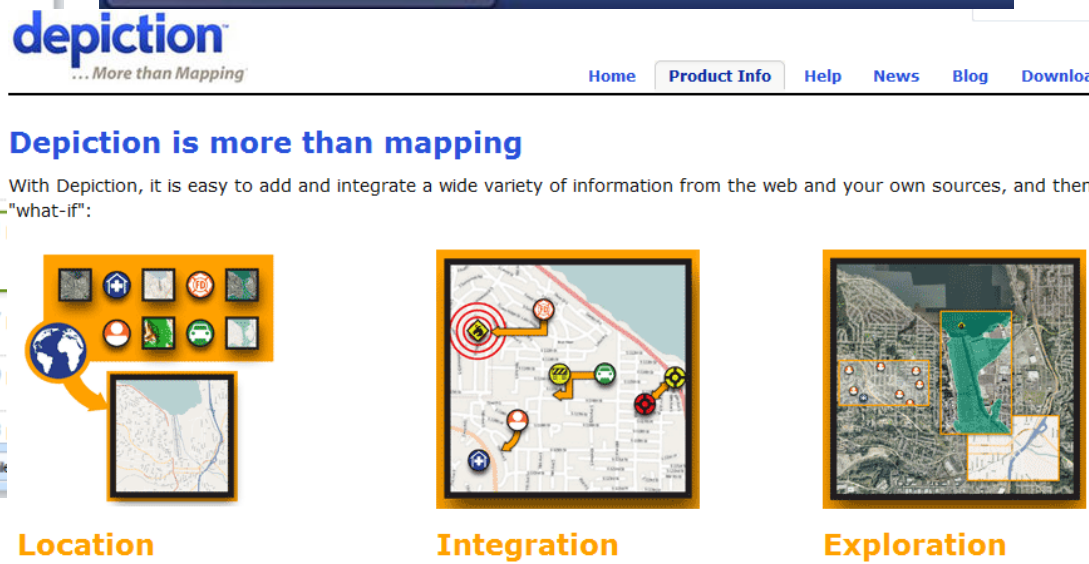
The Current Situation

- Conventional situation rooms are routinely used to oversee public health emergencies and disaster management operations in real time.
- Nowadays, large amounts of emergency data are increasingly coming from a wide range of sources in real or near-real time and need to be cross-linked and visualized where they spatially belong on maps of the affected regions.
- Also, emergencies are usually managed by multi-professional teams who, not uncommonly, are distributed in multiple geographic locations.

The Current Situation

- Because of these reasons, we have started to see physical situation rooms gradually being replaced (or combined) with virtual situation rooms that use online collaborative (and mostly 2-D –two-dimensional) platforms such as Depiction (http://www.depiction.com/), in addition to conventional Web conferencing.
- These platforms, although usable and helpful, leave much to be desired, as they are **lacking the 'third dimension', which is needed to create a proper perception of the emergency space, as well as a sense of co-presence of other virtual team members**.

Current flat Web collaboration tools Like Depiction, Google Wave and Microsoft Vine can be Used in virtual public health emergency situation room applications, but leave much to be desired!



The Proposed Solution

- To overcome this limitation, we are proposing the development of novel emergency and public health virtual situation rooms in a suitable 3-D (three-dimensional) virtual world (sometimes also called '3-D serious gaming platform'), where avatars of experts and professionals can collaborate together and discuss incident data in real time in a simulated 3-D space representing the physical location where the emergency/public health incident of interest is unfolding and reflecting all changes taking place there (again in real time).

The Proposed Solution

- The real-time link between the virtual world and the physical world incident would be two-way and multimodal involving geo-tagged physical/ environmental sensor data feeds, citizen-contributed data (as found in Microsoft Vine and 'Who Is Sick' http://www.whoissick.org/), data gleaned via automatic analysis of Social Web content (*cf.* Google Flu Trends http://www.google.org/flutrends/), textual and 3-D spatialized audio/voice exchanges between virtual team members, video feeds, 3-D simulations and animations, various Web mashups, and shared desktop applications, among other possibilities.

Emergency/Public Health Situation Rooms (*and more*) Using 4-D GIS

- 4-D GIS = 3-D Geographic Information Systems, plus the temporal/real-time dimension (= 4-D)—serve very well the classic Person-Place-Time Triad.
- A collaborative and interactive platform that marries virtual globes (such as Google Earth™) and 3-D virtual worlds (such as Second Life®/OpenSim), and complements/ tightly **integrates** them with other key technologies, e.g., real-time, geo-tagged RSS feeds (including data feeds from physical sensors) and geo-mashups (using Web services like Yahoo! Pipes), etc.

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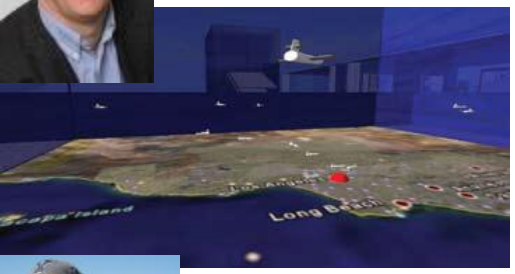


OpenSimulator

open source

metaplace where worlds grow

pivote

A novel 3-D virtual world presence/ server, including:

- immersive visual collaboration and communication platform
- open and controlled/secured-access sections
- reusable toolbox of objects
- training/how-to module

Internet

Backend databases/ data sources

Short Video

Internet

Internet

Internet

Integration:

- with other 3-D virtual world presences and platforms like Second Life®
- with 3-D mirror worlds like Google Earth™
- with the 2-D (flat) Social Web

YouTube

Second Life

facebook

LinkedIn

digg

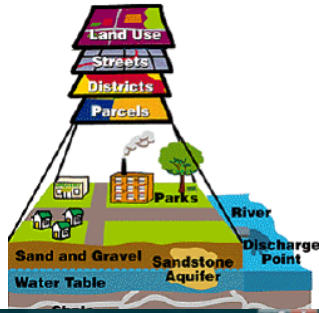
skype

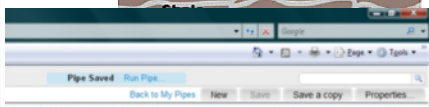
delicious

slideshare

Multi-device/bandwidth support for flexible and usability-optimized access

... etc.





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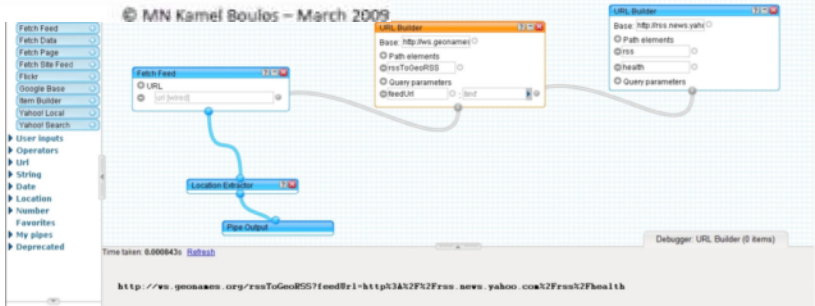

Emergency/Public Health Situation Rooms (*and more*) Using 4-D GIS

- The platform weaves data and services in real-time from different sources into a new rich 'datascape' that better reflects the current situation (the 'big picture') in novel ways that are easier to understand and manage (**'infoglut' management**).
- The platform is **secure**, enabling multiple distributed persons to "see" each other, visualise relevant data together in unique ways, conduct 3-D simulation scenarios/ 'what-if' scenarios, and collaborate in real-time, each according to their assigned role and access privileges.
- Much suited for emergency and disaster management in real-time, e.g., managing an influenza pandemic and coordinating actions at global, regional and local levels.

Other Platform Highlights

- **Modular**: The platform will offer a reusable toolbox of programmable objects that can be easily (re)used in various scenarios.
- **Mobile**: it is now possible to stream a 3-D virtual world to a suitable mobile phone (see, for example, http://www.youtube.com/watch?v=XwRnjbkljnc) or other Internet-enabled, small form factor mobile devices, making this vision end-user device and platform-independent and thus suitable for those members of the emergency operations team who are on the move.

Other Platform Highlights

- True **stereoscopic** vision can be added using readily available technologies such as NVIDIA 3D Vision for more realistic 3-D visualization, with a better sense of 3-D depth and relief.
- Glasses-free solutions, including options for mobile device displays such as the iPhone, and stereoscopic 3-D virtual globes with more natural multitouch navigation are already available today (Kamel Boulos and Robinson, 2009).

Visualisation

technical

Bringing GIS to virtual spaces and virtual worlds

by Maged N Kamel Boulos, University of Plymouth, and David Burden, Daden Limited

Further Reading

When Google Earth and Google Maps first appeared many people marvelled at the ability to zoom in on almost any part of the planet and see objects at little more than 1 m resolution.

However, the imagery is static, and relatively out of date. But what made Google Earth come

since the 1990s). Here again it is the interfacing of the virtual space to real world data which can start to open up

Newsglobe - dynamic data on the web

When we first encountered Google

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Maged N Kamel Boulos (University of Plymouth)

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