The Challenges, Services and Real - Time Capabilities of Mobile and Web GIS for Emergency Management in Nigeria

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AREAS OF APPLICATION:

1.WHAT IS MOBILE GIS?

2.WHAT IS GIS?

3.CHALLENGES AND LIMITATIONS

4.EMERGENCY MANAGEMENT IN NIGERIA, CURRENT STATUS, PROBLEMS

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1.0 Introduction

- **What is mobile GIS?**

"Mobile GIS is an integrated technological framework for the access of geospatial data and location-based services[LBS] through mobile [handheld] devices" (Tsou2004: 153).

Mobile GIS emerged in the 1990s, with integration of GPS, mobile data connections and geographic information in a portable handheld device.

Mobile technologies were initially developed for military use: selective availability.
Economic driver: growing consumer demands for location-based services (LBS).
- Commercial users: e.g. companies
- Recreational users: e.g. shoppers, trampers

- Mobile systems allow GIS tools to be accessed wirelessly and utilized in field situations, away from the desktop, for a sustained period of time (Raper2009: 4).

- The advent of the Mobile and Web GIS are great milestones in the evolution of civilization. Everything that happens somewhere, knowing "what" is "where" and "why" it is there can be actually critically important for making decisions, action plans and development.

Introduction Cont.

- **What is GIS?**

  Geographic Information System (GIS) is the technology as well as the science for handling the "where" type of questions.

- This paper presents a framework of how Mobile and Web GIS have become embedded in many Location Based Services (LBS) applications, particularly in navigation functions and location awareness.

- Mobile and web GIS have taken advantage of technologies (wireless network, mobile devices, and Smartphone) to offer the possibility of exchanging and analyzing Spatial Information in real geographic world time.

CHALLENGES AND LIMITATIONS:

- The challenges involved include the scarce resource of mobile devices in respect with memory size, network limitation, computing power, communication bandwidth and accessing multiple heterogeneous data sources.

- The utilization of Mobile and Web GIS systems enables effective practice of emergency management of any possible disaster events whereby giving personnel information to plan, implement, modify and respond in real time world operations by simply providing a rich set of data management, visualization, analysis capabilities and Spatial Service Sharing.

2.0 EMERGENCY MANAGEMENT PROCESS

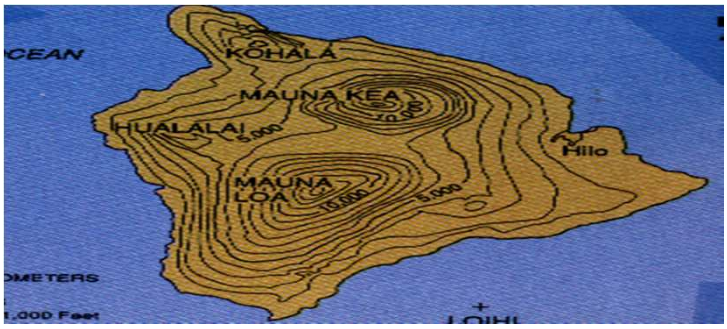
- The process of emergency management has several phases beginning from:
  - planning to mitigation and preparedness (as pre-emergency phase) and
  - response and recovery (as during and post-emergency phases).

EMERGENCY MANAGEMENT PROCESS cont.

- The implementation of disaster management systems can save thousands of lives, but when it is poorly implemented it can cause considerable casualties, damage and loss in various dimensions when the disaster actually happens.

EMERGENCY MANAGEMENT PROCESS Cont.

- The main components of these tools are: up-to-date topographical maps, remote sensing, GIS database, appropriate Spatial Data Infrastructure (SDI), early warning systems through international cooperation, as well as Mobile and Web GIS.



3.0 MOBILE AND WEB GIS SYSTEM

- Mobile and web based GIS system are integrated software and hardware frameworks for easy access of geospatial data and services through mobile devices via wireless networks (Tsou, 2004).
- With the mobile and web GIS technology, emergency workers, inspectors, maintenance teams, utility crews, fire fighters, and many other field workers now have the potential to access the enterprise geospatial data at the server-side to accomplish their tasks with high level of accuracy.

3.1 Mobile and Web GIS Services for Emergency Response and Disaster Recovery

- In disaster management, emergency response is the most critical phase because it enables informed decision to be carried out as at when due. Mobile and web GIS services can play a very vital role in evacuation, dispatch and vehicle tracking.
- It makes it possible for the collection of infield data and real time updating of Emergency Operation Centre (EOC) database. The data collected gives precise information about site of bomb blast, location of victims, burning buildings, closed routes, accidents, etc.
- The use of mobile and web GIS makes it easy for emergency workers to access EOC database which gives information on the present status of emergency situation. Mobile GIS also provides the capability of analyzing these data to make the best infield decisions for emergency operations.

4.0 EMERGENCY MANAGEMENT IN NIGERIA

- A quick survey of the Nigerian environment reveals that the administrative, technical and technological expertise required for sustainable emergency management and reduction are grossly inadequate and, where they exist, dismally uncoordinated.

There are no adequate geodata infrastructure for holistic emergency and disaster management. The national organization responsible for disaster management, NEMA, with its States counterpart is mainly engaged in the recovery component of disaster management with low emergency response capability.

5.0 CHALLENGES OF MOBILE AND WEB G.I.S FOR EMERGENCY MANAGEMENT IN NIGERIA

- Irrespective of the massive role mobile and web GIS play in emergency management, these devices are not well utilized in Nigeria which makes it impossible for emergency response agents like fire fighters to respond quickly to disasters when they occur, such as fire outbreak in residential and market areas.

- To effectively and efficiently use these devices and platforms, network need to be stable and excellent to enable the updating and transmission of real-time data, this will enable informed decisions to be taken depending on the existing situation. But in Nigeria, the services of the various network providers cannot be relied upon due to their limitations mostly when they are most needed.

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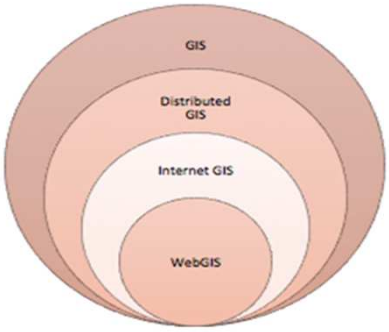
- This situation will affect the ability of emergency workers to access EOC database to get information on the present status of emergency situation. Since network signals in Nigeria deteriorate daily, it affects the computing power of these devices to acquire spatial data, store it and share the information for rapid action.

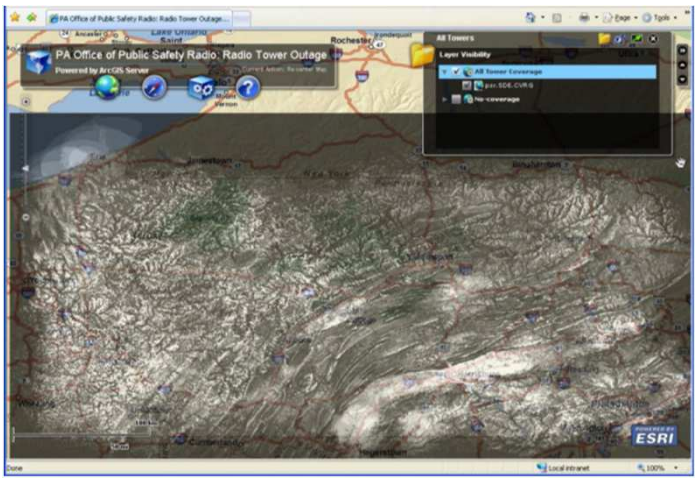
6.0 RECOMMENDATIONS

- For the country to benefit from Mobile and Web GIS technology, GIS database must be created, National Geospatial Data Infrastructure must be speedily implemented;
- the UN's recommendations on disaster management and reduction should be domesticated to establish international collaborative disaster management programs that will enable her access the international space initiatives on Space Technology for Disaster Reduction and Management.
- The National Emergency Management Authority, NEMA, must be overhauled. There must be aggressive capacity building, and establishment of technological transfer programs. The organization must also be technically empowered by provision of geodata infrastructure driven by Mobile and Web GIS.
- As part of its capacity building, emergency reduction and management programs must be established at both local and state government levels

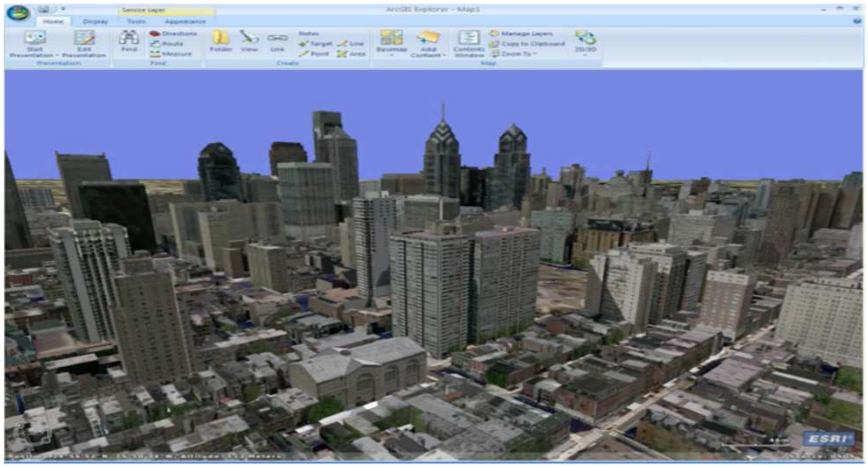
7.0 CONCLUSION

- Mobile and Web GIS are veritable tools that can be rapidly deployed for emergency management.
- Provides geospatial information on emergency sites in near real time.
- Enables emergency agencies to plan quick responds strategy as infield information could be immediately available.
- Lack of such timely information resulted into inefficient response to disasters in Nigeria.
- The hiatus in power and communication sectors etc contribute to none deployment of mobile GIS system in Nigeria.
- This paper has been able to highlight some of the vital roles mobile and web GIS play in emergency management.
- Government is therefore encouraged to invest heavily on this recent mobile technology to enable it protect lives and properties as well as tackle any form of environmental and social issues such as the problem of insurgency and constant fire outburst and road accidents.





BEAUTIFUL WORLD.



SAVE OUR WORLD.

Many thanks for listening!