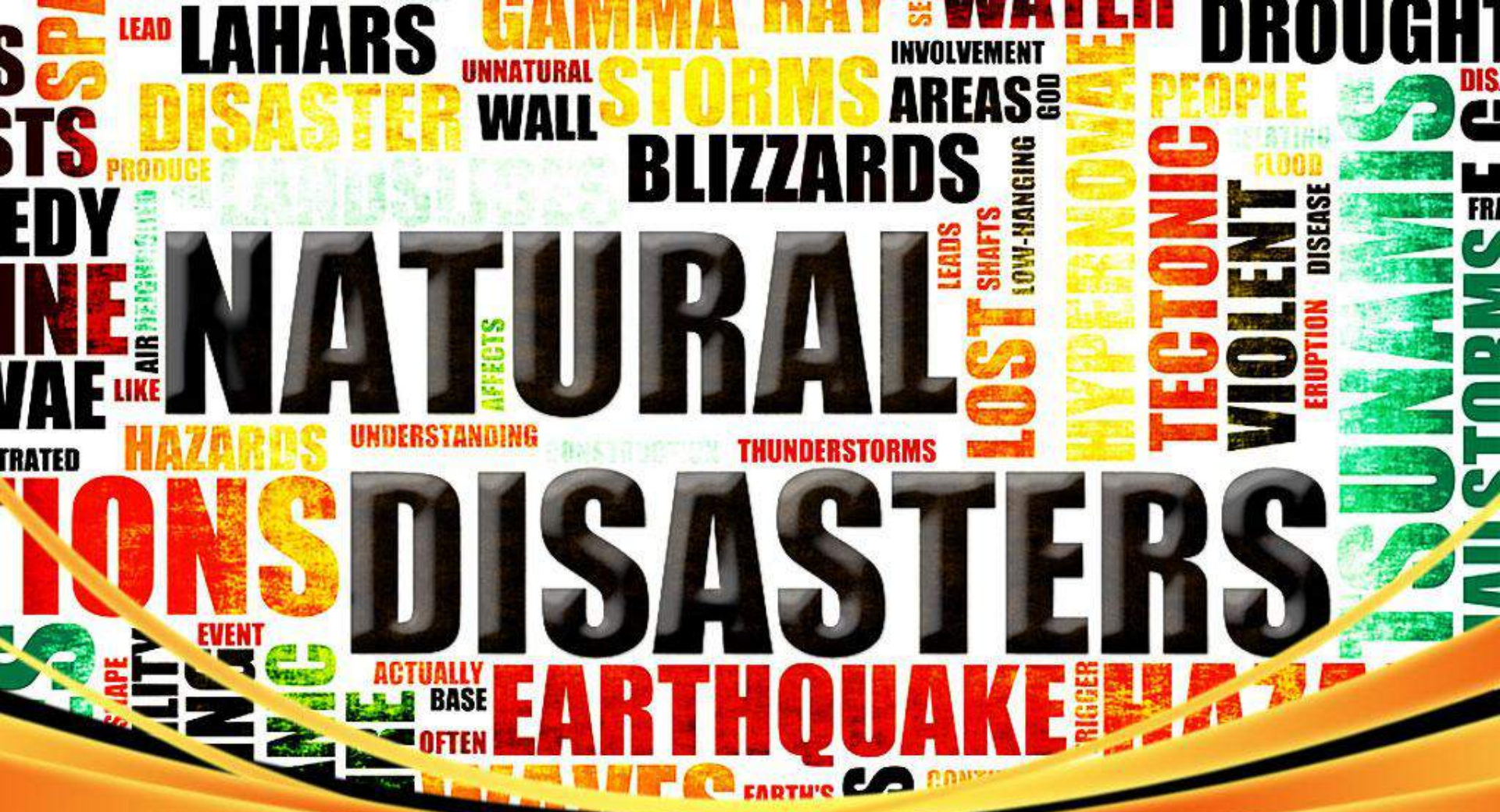

UNOOSA

China Conference

September 19-21, Beijing

International Conference on Space-Based Technologies for Disaster Risk Reduction: Understanding Disaster Risk

Integration of Enhanced Data Sources into a Standardized Geospatial System for Multiple Stakeholders

September 19-21, 2016

Beijing, China

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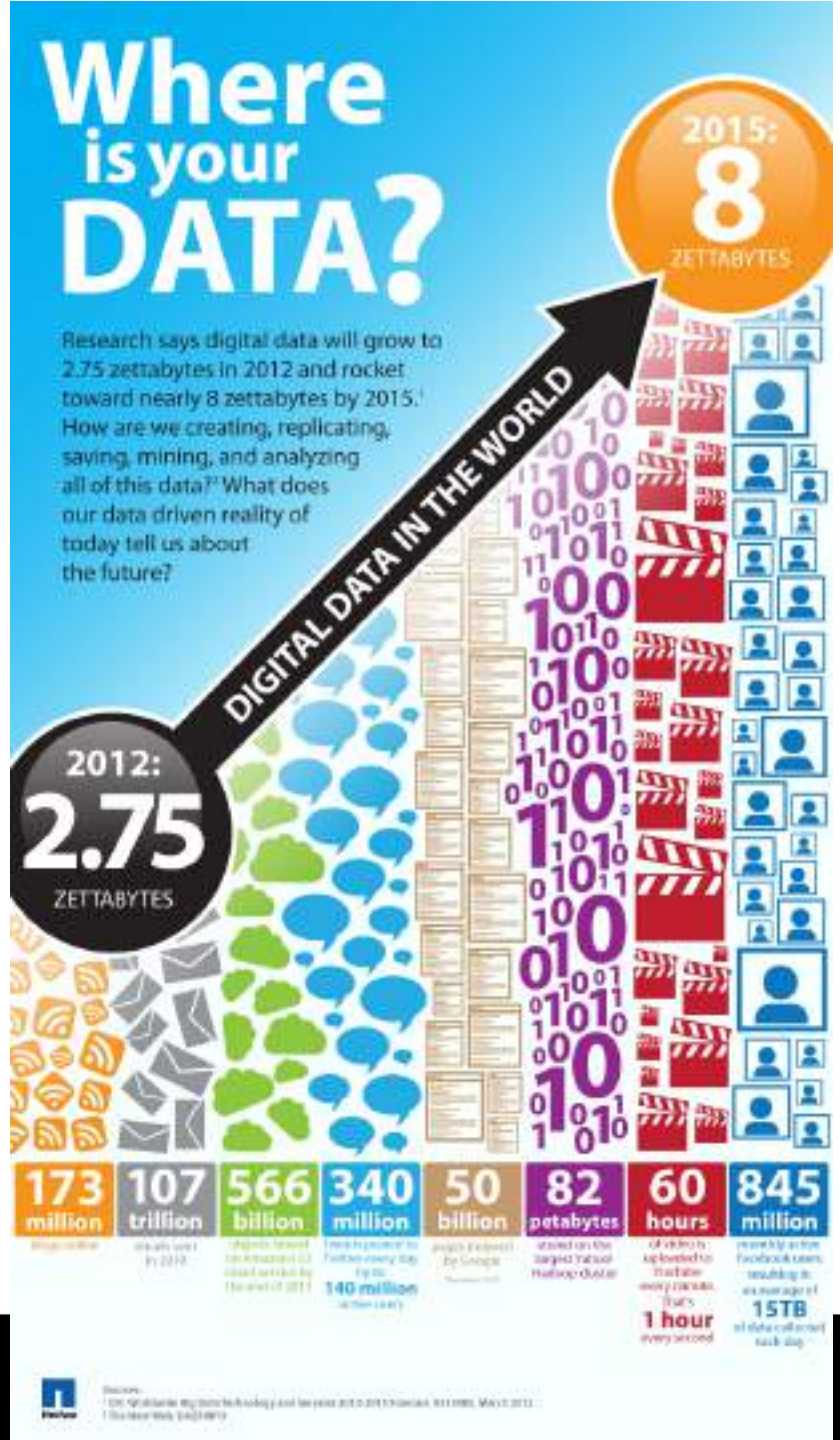
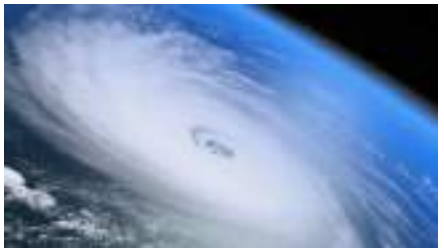


Global mobile traffic will grow 8-fold between 2015 and 2020. Data emanating will reach 30.6 exabytes (billion gigabytes) MONTHLY.

By 2002 there will be 1.5 mobile devices for every human on the planet. That means 11.6 billion mobile devices including M2M modules (or devices that talk to each other).

Current Disaster Characteristics

1. Increasing number and severity of natural disasters



2. Short or no-warning disasters
3.  Low probability, high-impact disaster (Eyjafallajokull)
4. Devastation of cascading disasters and linked multi-hazards (Tohoku)

5. Importance of an understanding scenarios by disaster managers

UNISDR – Mapping Disaster Local Risks

- City specific to map vulnerabilities
- Making Cities Resilient initiative
- Critical Infrastructure mapping
- Competition for identifying the 10 essentials for making cities resilient

The Ten Essentials for Making Cities Resilient

1. Organise for Disaster Resilience
2. Identify, Understand, and Use Current and Future Risk Scenarios
3. Strengthen Financial Capacity for Resilience
4. Pursue Resilient Urban Development and Design
5. Safeguard Natural Barriers to Enhance Ecosystems' Protective Functions

The Ten Essentials for Making Cities Resilient

6. Strengthen Institutional Capacity for Resilience
7. Understand and strengthen Societal Capacity for Resilience
8. Ensure Effective Disaster Response
9. Expedite Recovery and Build Back Better

Specific Community Planning for Rural and Remote Communities

CERT
Certified Emergency
Response Teams

EXERCISES
Functional and Full Scale
Exercises

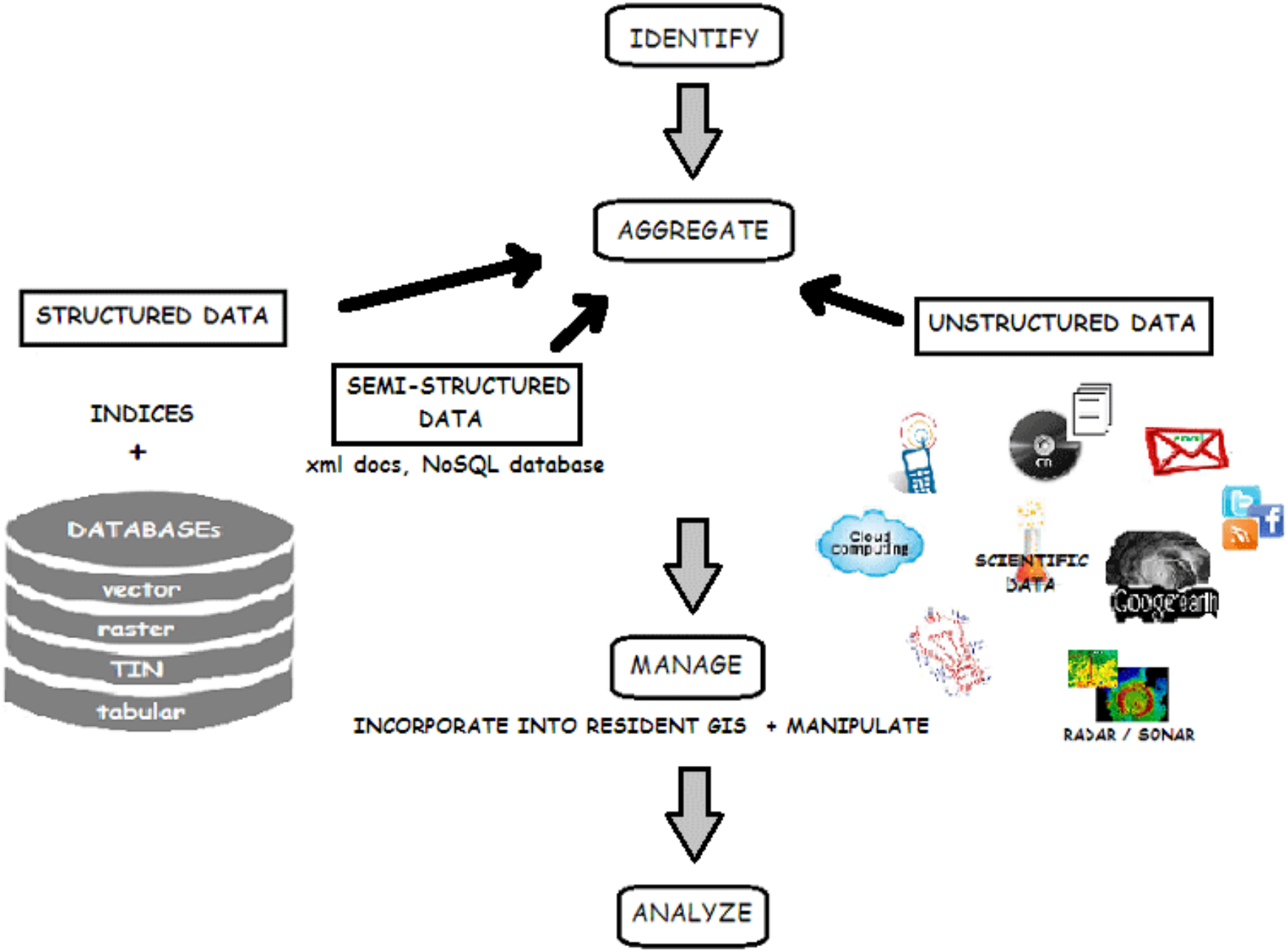
Global Social Network ubAlert

- “ubAlert is a global social network that operates to save lives by sharing the knowledge of the world's citizens with those in danger.

- “We intend to create the world's largest, most reliable, all-hazard disaster alerting network by combining data from global institutions and data providers with crowd-sourced user accounts. Our global emergency warning platform…. immediately alerts those who may be impacted, depending on the severity and location.”

Big Data Approach Applications

- Climate Modeling/Analysis
- Intelligence Gathering
- Business Intelligence
- Aviation
- Disease Monitoring/Surveillance
  - Disaster Risk Assessment
  - Disaster Response
  - Disaster Recovery


IDENTIFY
AGGREGATE
STRUCTURED DATA
INDICES
+
DATABASES
vector
raster
TIN
tabular
SEMI-STRUCTURED DATA
xml docs, NoSQL database
UNSTRUCTURED DATA
Cloud computing
SCIENTIFIC DATA
Google earth
RADAR / SONAR
MANAGE
INCORPORATE INTO RESIDENT GIS + MANIPULATE
ANALYZE

Big Data

1. Exactly what is it and what does in include/exclude? Is more always better??

The concept of Rich Data vs. the Data Warehouse

- Big data consolidates information. Rich data drive actual growth
- Big data gathers the picture. Rich data makes it meaningful.
- Big data quantifies the world. Rich data changes it.

http://www.computerworld.com/article/2887218/big-data-vs-rich-data.html

Big Data

2. When we speak of using Big Data for Disaster Response, what does that mean? US-JAPAN Collaboration
   - Human-Centered Situation Awareness Platform for Disaster Response and Recovery
   - Data-Driven Critical Information Exchange in Disaster-Affected Public-Private Networks
   - Efficient and Scalable Collection, Analytics and Processing of Big Data for Disaster Applications
   - Disaster Preparation and Response via Big Data Analysis and Robust Networking
   - A Big Data Computational Laboratory for the Optimization of Olfactory Search Algorithms in Turbulent Environments
   - Dynamic Evolution of Smartphone-Based Emergency Communications Networks

Big Data

3. How does that scope of information change when we include all phases of Disaster Management?

- In the past 5 years, the access to Big Data and the Internet of Things (IoT) has increased astronomically
- Amount of devices that connect to the internet will rise from about 13 billion today to 50 billion by 2020.

36th International Conference of Data Protection and Privacy Commissioners 2014 Mauritius

Two documents resulted:

- Mauritius Resolution on Big Data
- Mauritius Declaration on the Internet of Things

Definition of Big Data

- It's just data

Definition of the Internet of Things

- The billions of smart devices that talk to each other and us
- http://bcove.me/65gdf6t8

- Unlocking the Potential of the Internet of Things
- http://www.mckinsey.com/business-functions/business-technology/our-insights/the-internet-of-things-the-value-of-digitizing-the-physical-world

- Big Data is now available to, and being used by, GIS Platforms to generate smart maps
- Wide array of companies that can provide mapping abilities where geospatial data is combined with selected Big Data sources
- The golden prize is the platform that will be used to integrate data from the Internet of Things with static data

Urban Environments

- Data, IoT and GIS: The Sentient City
  - Understanding of complex urban cities
    - System modeling
    - Scenario-bas – Hadoop ecosystems through Hivwed systems simulation
    - Real-time and near real-time analytics
    - Predictive analytics and prescriptive analytics
  - IoT Impact
    - Temperature, vibrations,movement, humidity, pressure sensors, faults in wiring, utilities, smart grid…..
  - Social media, sensor data can be merged – Hadoop ecosystems through Hive

“Connected Healthcare”

- Adjustable patient monitoring
- Enhance drug management
- Augmented asset monitoring and tracking
- Early intervention

https://dzone.com/articles/connected-healthcare-internet-of-things-examples-i

Integration of IoT and GIS

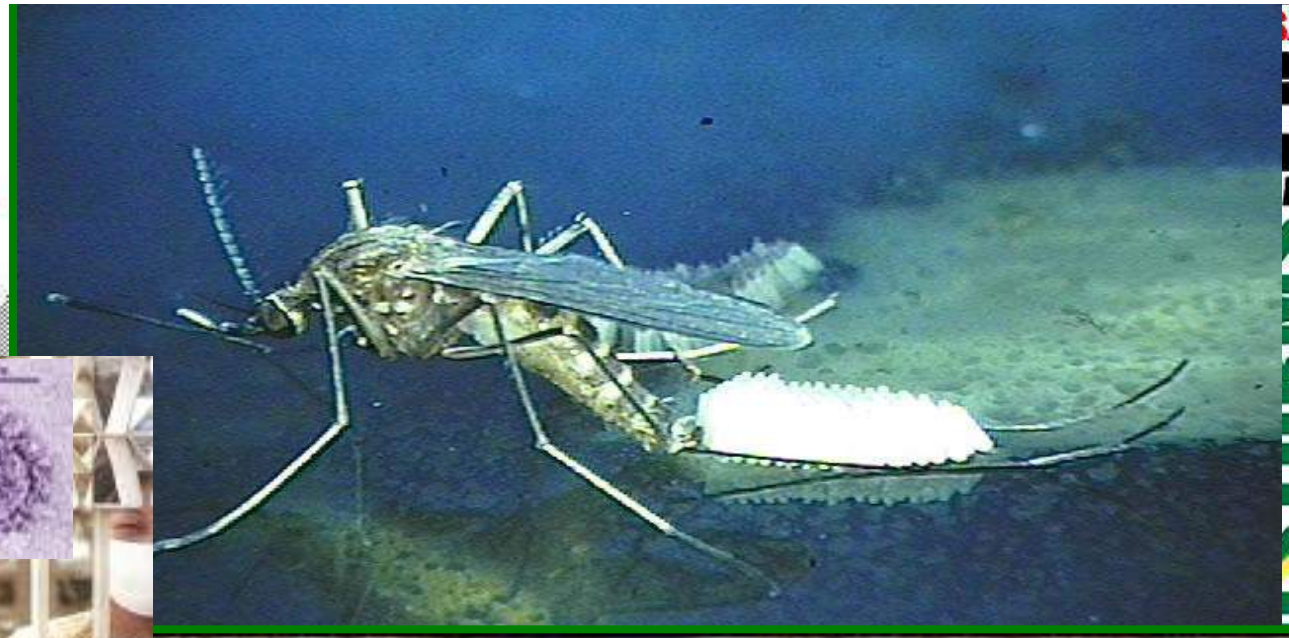
- Need for emergency managers to specifically explore the applicability of IoT to disaster scenarios to identify the most important applications to identify. For example, disaster managers, especially those in remote areas and third world nations need to be informed and consulted on what is available and how to make it most valuable to them.

In the Public Health Arena, Areas Where Remote Sensing is Needed* Include:

- Climate Change Parameters and Health
- Heat Island Effects in Urban Areas
- Precipitation (water, drought)
- Data on Risk Populations
- Detection of Algal Blooms That Are Harmful to Health
- Pesticides and Crop Prediction

*Communication issues exist between scientists and community health providers

Wigbels, L.D. 2011. Using Earth Observation Data to Improve Health in the United States: Accomplishments and Future Challenges. Center for Strategic and International Studies.



Used for Detecting Mosquito and Other Insect-Borne Illnesses

- Plague
- Lyme Disease
- Leishmaniasis
- West Nile
- H5N1 Avian Influenza

Polo. G., Labruna, M.B., and Ferreira. 2015. Satellite Hyperspectral Imagery to Support Tick-borne Infectious Diseases Surveillance. PLOS ONE. 10:1371

Transformation of Geospatial Data for Risk Reduction & Disaster Management – Challenges and Opportunities

1. Creation of a toolbox of disaster-specific products available to the disaster management community
2. Create networks and defined platforms for distribution of geospatial data products
3. Resources available to perform analyses/create products
4. Generation of rich data rather than massive amounts of data
5. How to analyze “large, noisy, and heterologous” data sets
6. Integration of crowdsourcing data
7. Need for a robust, scalable, geospatial data management system
8. Need for an open standard dissemination protocol
9. Use of an open Geospatial Consortium-based protocol

Summary

- A uniform platform must be designated for collection, analysis and creation of data products in the era of Big Data and IoT.
- Smart GIS should be focused more on Risk Assessment, Resilience, and Sustainability.
- There must be much better communication between geospatial data experts and disaster management professionals. Products must be defined and made available.
- There must be clear mechanisms for how to disseminate information to those needing it and for uniform procedures to train them how to use it.


Thank You for Your Kind Attention!
Please contact me for further information or reference source list.
hagen@sxu.edu

Session Presentations

- Gao Fen Satellite System
- Efficient Information Management in Sri Lanka: Achievements and Challenges
- Emergency Response and Preparedness in the Asia-Pacific Region
- Building National Data Infrastructure for Dynamic Risk Mapping and Monitoring – Framework, Methodology and Practice